

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

CONSTRUCTION PLANS

FEDERAL PROJECT X-A001 (160)

NH PROJECT NO. 16156

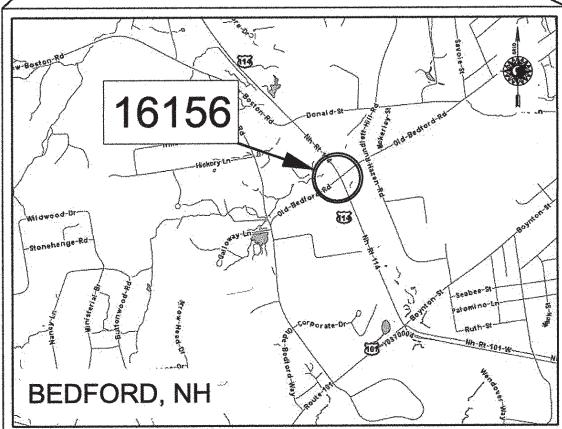
NH ROUTE 114

BOWMAN BROOK CULVERT REHABILITATION

DESIGN DATA

AVERAGE DAILY TRAFFIC 2016
AVERAGE DAILY TRAFFIC 2036
PERCENT OF TRUCKS
DESIGN SPEED
LENGTH OF 16156 PROJECT

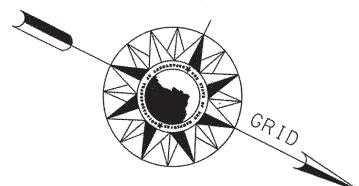
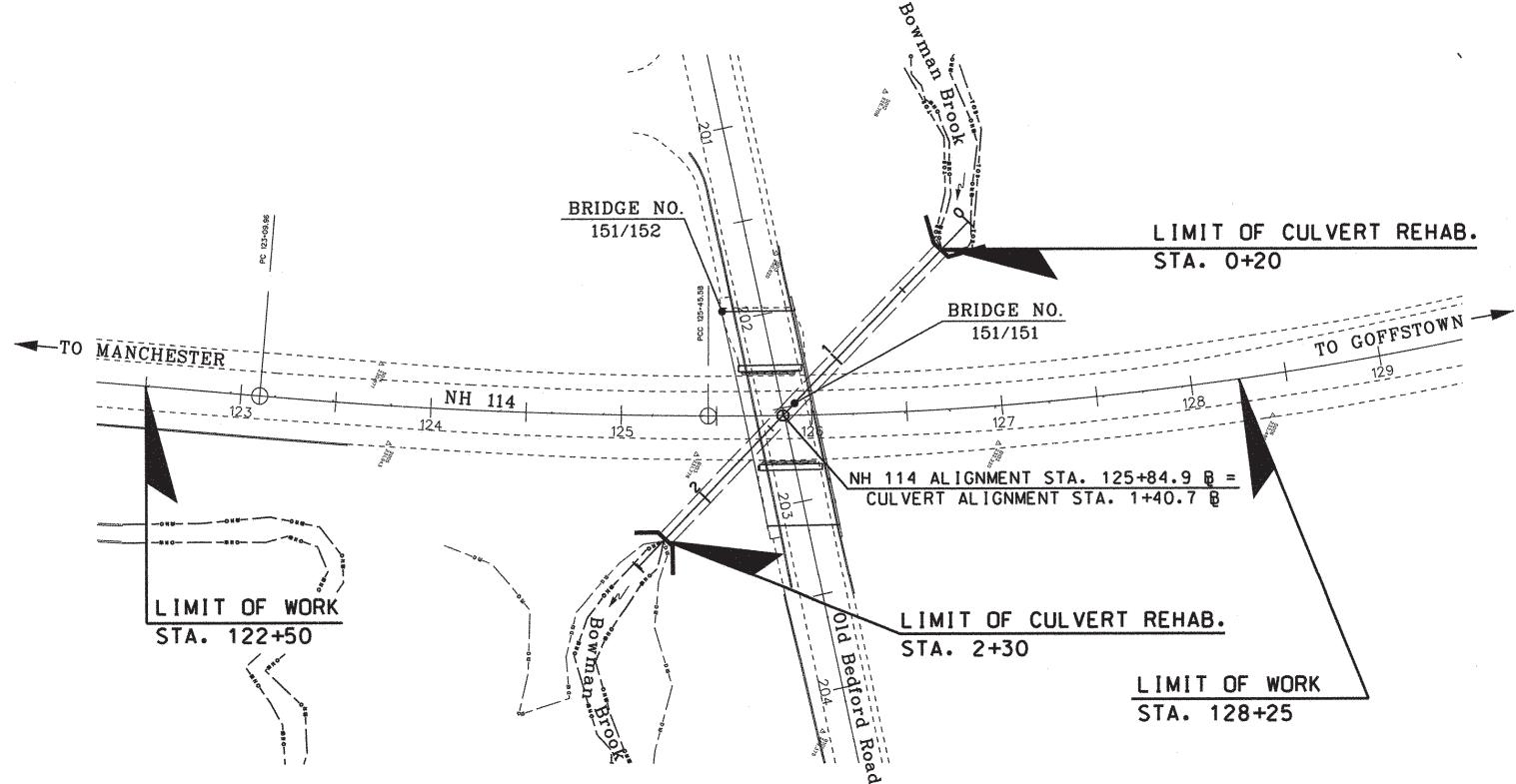
22,000
5%
45 MPH
0.11 MILE



LOCATION MAP

0.25 0.125 0 0.25 0.5 mi.

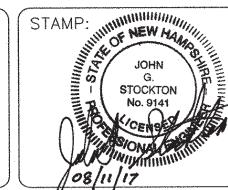
GRAPHIC SCALE: 1"=1/4 MILE



DRAWN BY T.J.W
CHECKED BY D.E.M
DATE 05/2017
DATE 05/2017

PLANS PREPARED BY:

STANTEC CONSULTING SERVICES, INC
288 SOUTH RIVER ROAD, BUILDING C, BEDFORD, NH 03110
TEL (603) 669-2000 FAX (603) 668-2670



08/11/17

**TOWN OF BEDFORD
COUNTY OF HILLSBOROUGH**

SCALE: 1" = 50'

NH DOT		THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION	
RECOMMENDED FOR APPROVAL 8/15/2017 DIRECTOR OF PROJECT DEVELOPMENT			
APPROVED: William J. O'Brien ASSISTANT COMMISSIONER AND CHIEF ENGINEER 8/16/17 DATE			
FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
X-A001(160)	16156	1	23

GENERAL NOTES

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	TITLE PAGE
2	INDEX OF SHEETS AND GENERAL NOTES
3.4	STANDARD SYMBOLS
5	ACCESS TYPICAL SECTION
6	SUMMARY OF QUANTITIES
	<u>BRIDGE PLANS</u>
7-23	NH ROUTE 114 OVER BOWMAN BROOK (BRIDGE NO. 151/151)

- ① FOR STANDARD PLANS, SEE "STANDARD PLANS FOR ROAD CONSTRUCTION" DATED 2010 (A BOUND BOOK).
- ② HIGH TENSION OVERHEAD TRANSMISSION LINES ARE LOCATED THROUGHOUT THE PROJECT WITH CROSSINGS AT VARIOUS LOCATIONS AND RUNNING ALONG THE ROAD THROUGHOUT THE PROJECT EVEN ON REGULAR POLES. THE CONTRACTOR IS ADVISED THAT EXTREME CAUTION WILL BE REQUIRED IN THE OPERATION OF EQUIPMENT, ESPECIALLY CRANES AND PILE DRIVING EQUIPMENT.
- ③ MODIFY SUPERELEVATION ON EXISTING CURVES BY THE USE OF A LEVELING COURSE TO THE RATES INDICATED ON THE PLANS OR AS ORDERED.
- ④ EXISTING DELINEATORS AND WITNESS MARKERS THAT ARE REMOVED AND DETERMINED BY THE ENGINEER TO BE IN ACCEPTABLE CONDITION SHALL BE RESET (SUBSIDIARY). ADDITIONAL DELINEATORS AND WITNESS MARKERS ORDERED WILL BE PAID UNDER THE APPROPRIATE ITEMS OF THE CONTRACT.
- ⑤ NO EXISTING MONUMENTS, BOUNDS, OR BENCHMARKS SHALL BE DISTURBED WITHOUT FIRST MAKING PROVISIONS FOR RELOCATION.
- ⑥ PERFORM ALL WORK WITHIN THE EXISTING RIGHT-OF-WAY, UNLESS OTHERWISE SHOWN ON THE PLANS OR AS ORDERED BY THE ENGINEER.
- ⑦ REMOVE UNPROTECTED PROJECT MARKERS (SUBSIDIARY).
- ⑧ SURVEY DATA FOR THIS PROJECT WAS COLLECTED BY SDR AND THE FIELD NOTES CAN BE FOUND IN THE SURVEY FIELD BOOK(S) 13399 & 10096. COORDINATES ARE NEW HAMPSHIRE STATE PLANE COORDINATES OF NAD83, 1986 ADJUSTMENT AND THE BEARINGS ARE GRID. ELEVATIONS ARE REFERENCED TO NGVD 1929.
- ⑨ QUANTITIES FOR EMBANKMENT AND EXCAVATION FOR SLOPE ROUNDINGS AS SHOWN ON THE TYPICALS HAVE NOT BEEN CALCULATED AND ARE NOT INCLUDED IN THE QUANTITY SUMMARIES, AND ARE CONSIDERED SUBSIDIARY TO THE APPROPRIATE 203 ITEMS.

THE FOLLOWING GENERAL NOTES WILL BE USED ON THIS PROJECT:									
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STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
INDEX OF SHEETS AND GENERAL NOTES				
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
9-1-2016	02_index_sheet	16156	2	23

GENERAL

EDGE OF PAVEMENT	PROPOSED ROADWAY	existing roadway	(pavement removed outside slope lines)	ORIGINAL GROUND (TYPICALS)	
TRAVELED WAY					
DRIVEWAYS			(label surface type)	ROCK OUTCROP	
BUILDINGS				ROCK LINE (TYPICALS & SECTIONS ONLY)	
FOUNDATION				GUARDRAIL (label type)	
LEACH FIELD				JERSEY BARRIER	
BRIDGE CROSSINGS				CURB (LABEL TYPE)	
STEPS AND WALK				STONE WALL	
INTERMITTENT WATER COURSE				RETAINING WALL (LABEL TYPE)	(points toward retained ground)
SHORE LINE				FENCE (LABEL TYPE)	
POTENTIAL WET AREA SYMBOL				SIGNS	
BRUSH OR WOODS LINE				GAS PUMP	○ gp
TREES (PLANS)		(deciduous) (coniferous)	(stump)	FUEL TANK (ABOVE GROUND)	○ ft (label size & type)
TREE OR STUMP (CROSS-SECTIONS)		(show station, circumference in feet & type)		STORAGE TANK FILLER CAP	○ fc
HEDGE				SEPTIC TANK	○
MONITORING WELL				GRAVE	□ gr
WELL				MAILBOX	□ mb
FLAG POLE				VENT PIPE	○ vp
				SATELLITE DISH ANTENNA	da
				PHONE	☒ ph
				GROUND LIGHT/LAMP POST	⊕ gl ☺ lp
				BORING LOCATION	○ B
				TEST PIT	☒ TP
				INTERSTATE NUMBERED HIGHWAY	293
				UNITED STATES NUMBERED HIGHWAY	3
				STATE NUMBERED HIGHWAY	102

SHORELAND - WETLAND

WETLAND DESIGNATION AND TYPE	
DELINEATED WETLAND	- DW - DW - DW -
ORDINARY HIGH WATER	- OHW - OHW -
TOP OF BANK	- TOB - TOB -
TOP OF BANK & ORDINARY HIGH WATER	- TOBOHW - TOBOHW -
NORMAL HIGH WATER	- NHW - NHW -
WIDTH AT BANK FULL	- WBF - WBF -
PRIME WETLAND	- PWET - PWET -
PRIME WETLAND 100' BUFFER	- PWET100 - PWET100 -
NON-JURISDICTIONAL DRAINAGE AREA	- NJDA - NJDA -
COWARDIN DISTINCTION LINE	- CDL - CDL -
TIDAL BUFFER ZONE	- TBZ - TBZ -
DEVELOPED TIDAL BUFFER ZONE	- DTBZ - DTBZ -
HIGHEST OBSERVABLE TIDE LINE	- HOTL - HOTL -
MEAN HIGH WATER	- MHW - MHW -
MEAN LOW WATER	- MLW - MLW -
VERNAL POOL	- VP - VP - VP - VP
SPECIAL AQUATIC SITE	- SAS - SAS - SAS
REFERENCE LINE	- REF - REF - REF
WATER FRONT BUFFER	- WB50 - WB50 -
NATURAL WOODLAND BUFFER	- NWB150 - NWB150 -
PROTECTED SHORELAND	- PS250 - PS250 -
INVASIVE SPECIES LABEL	I.S. I.S.
INVASIVE SPECIES	INV INV INV

FLOODPLAIN / FLOODWAY

500 YEAR FLOODPLAIN BOUNDARY	- FP500 - FP500 -
100 YEAR FLOODPLAIN BOUNDARY	- FPI00 - FPI00 -
FLOODWAY	- FW - FW - FW -

ENGINEERING

CONSTRUCTION BASELINE	30 31 32
PC. PT. POT (ON CONST BASELINE)	○
PI (IN CONSTRUCTION BASELINES)	△
INTERSECTION OR EQUATION OF TWO LINES	○
ORIGINAL GROUND LINE (PROFILES AND CROSS-SECTIONS)	
PROFILE GRADE LINE (PROFILES AND CROSS-SECTIONS)	
CLEARING LINE	
SLOPE LINE	
SLOPE LINE (FILL)	
SLOPE LINE (CUT)	
PROFILES AND CROSS SECTIONS:	
ORIGINAL GROUND ELEVATION (LEFT)	72.5
FINISHED GRADE ELEVATION (RIGHT)	79.1

SHEET 1 OF 2

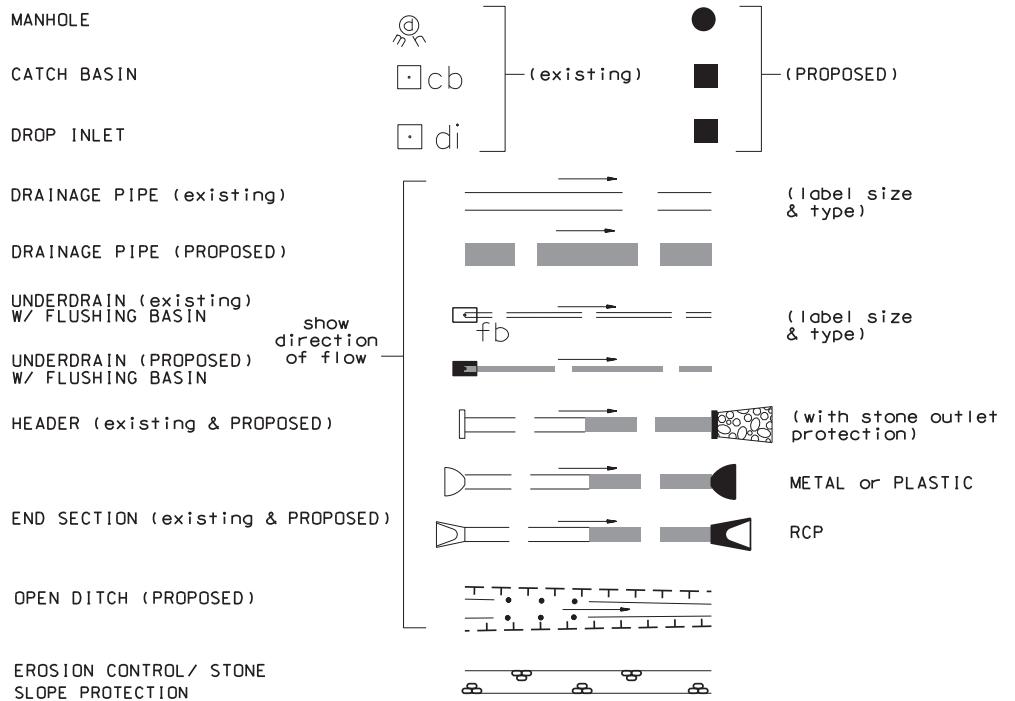
STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

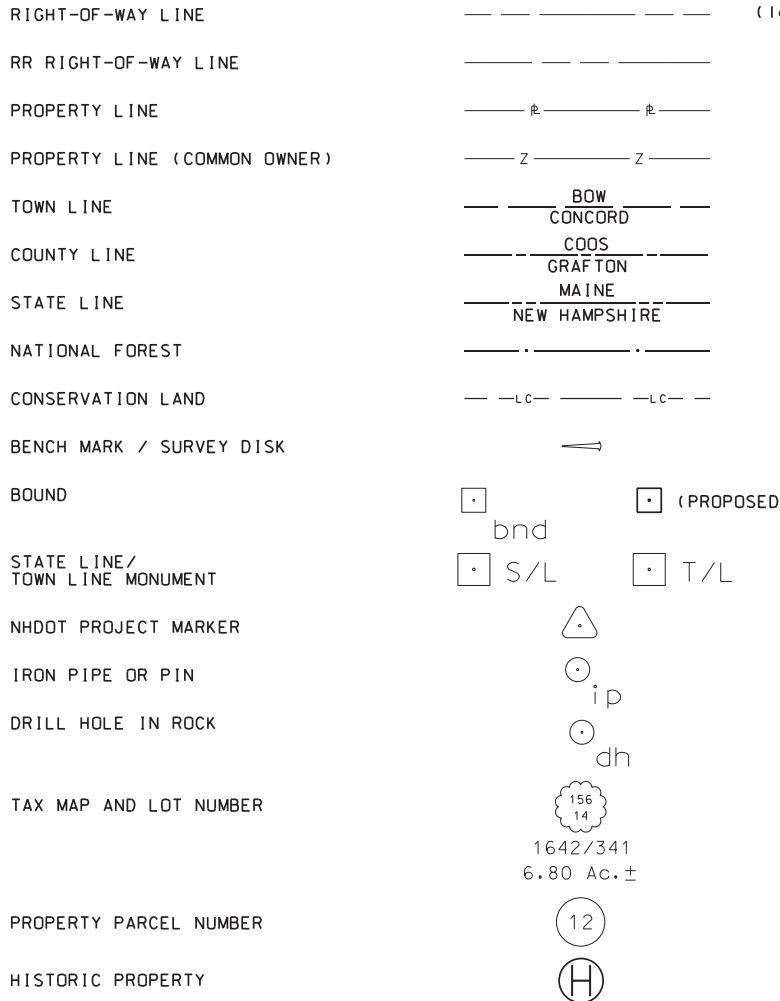
STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11-21-2014	03_std symb1	16156	3	23

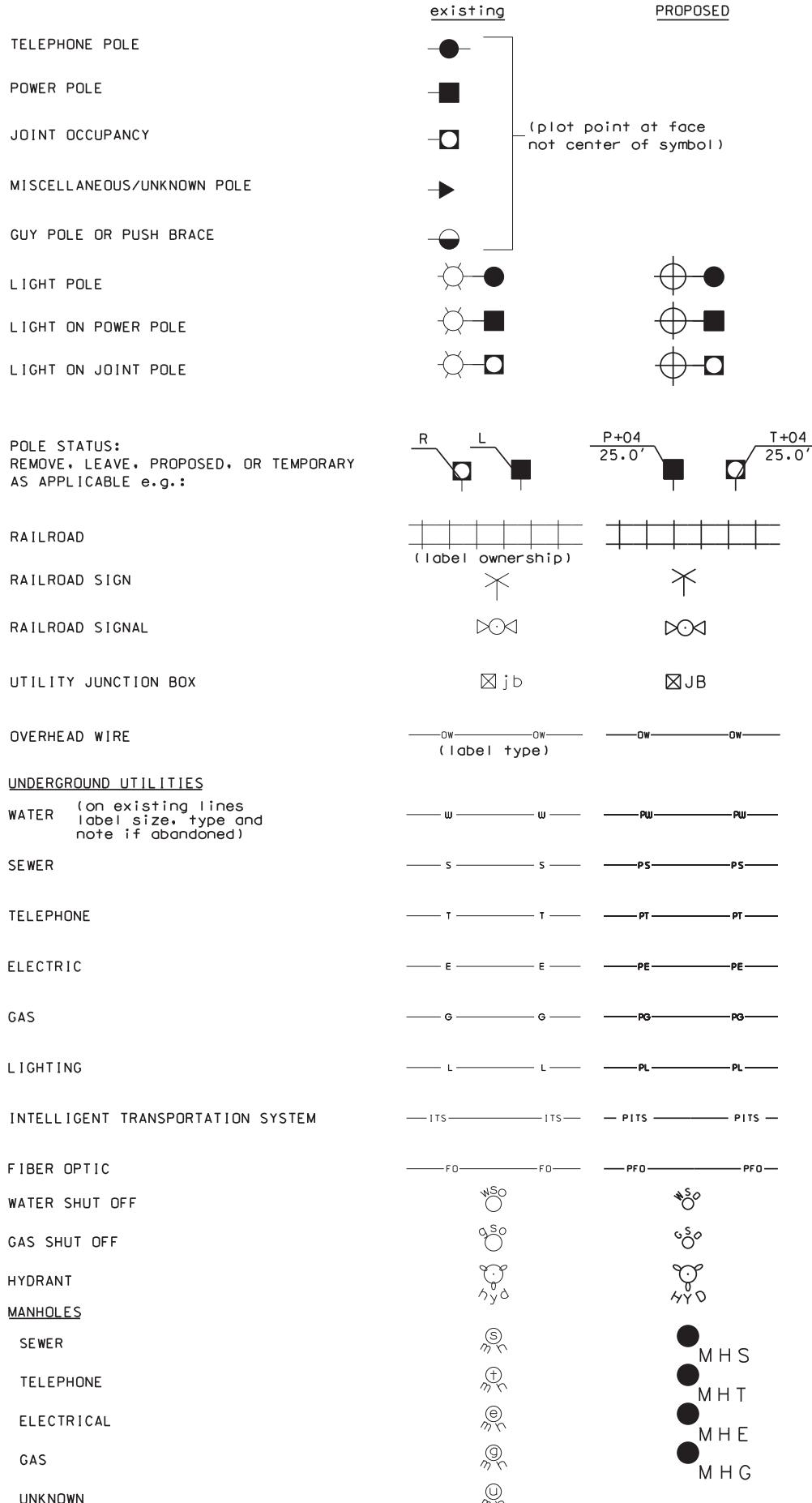
DRAINAGE



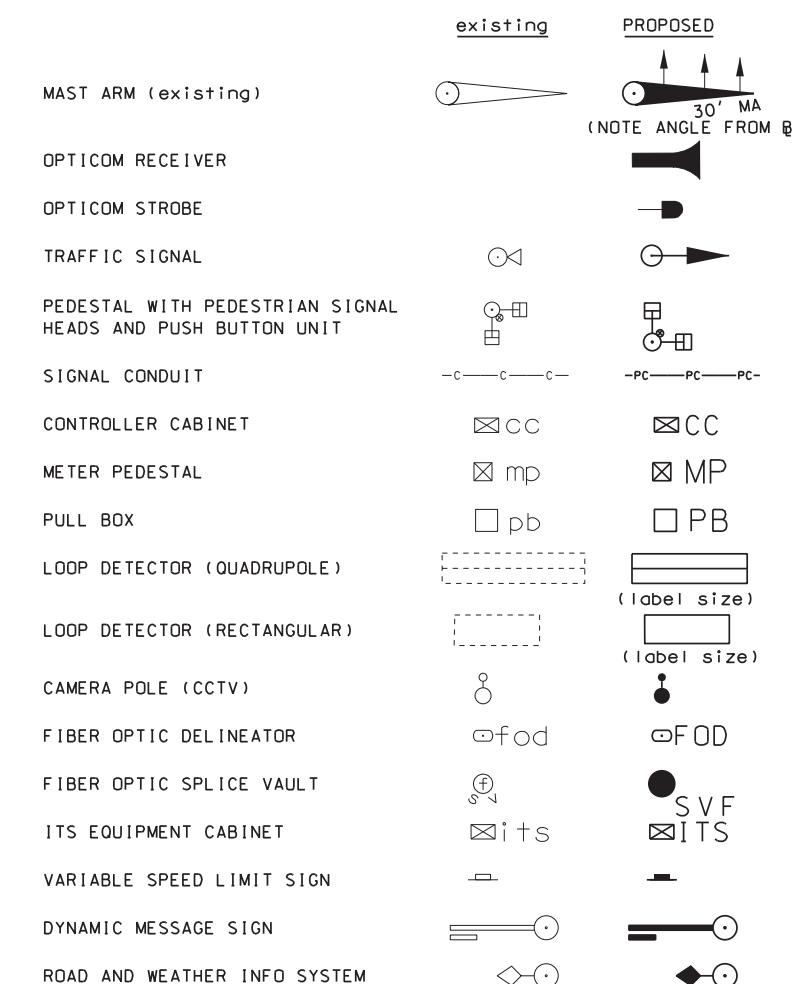
BOUNDARIES / RIGHT-OF-WAY



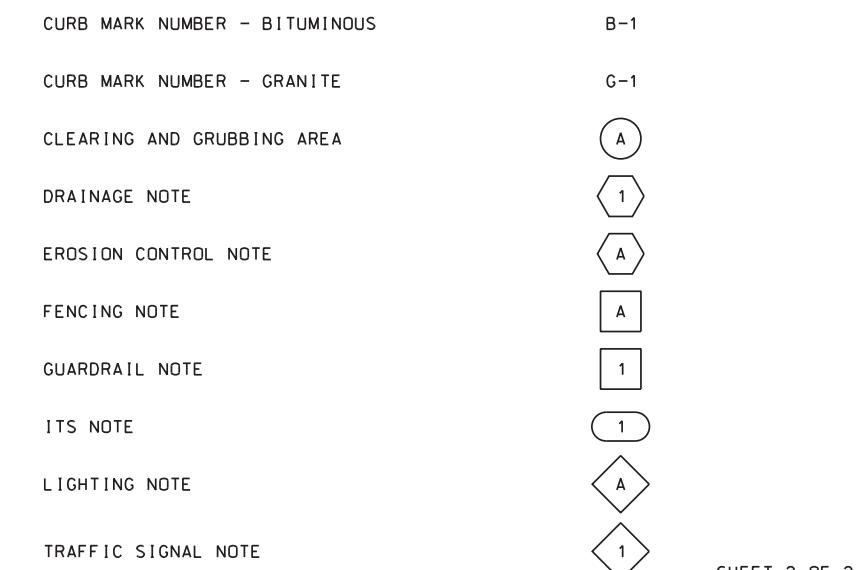
UTILITIES



TRAFFIC SIGNALS / ITS



CONSTRUCTION NOTES



SHEET 2 OF 2

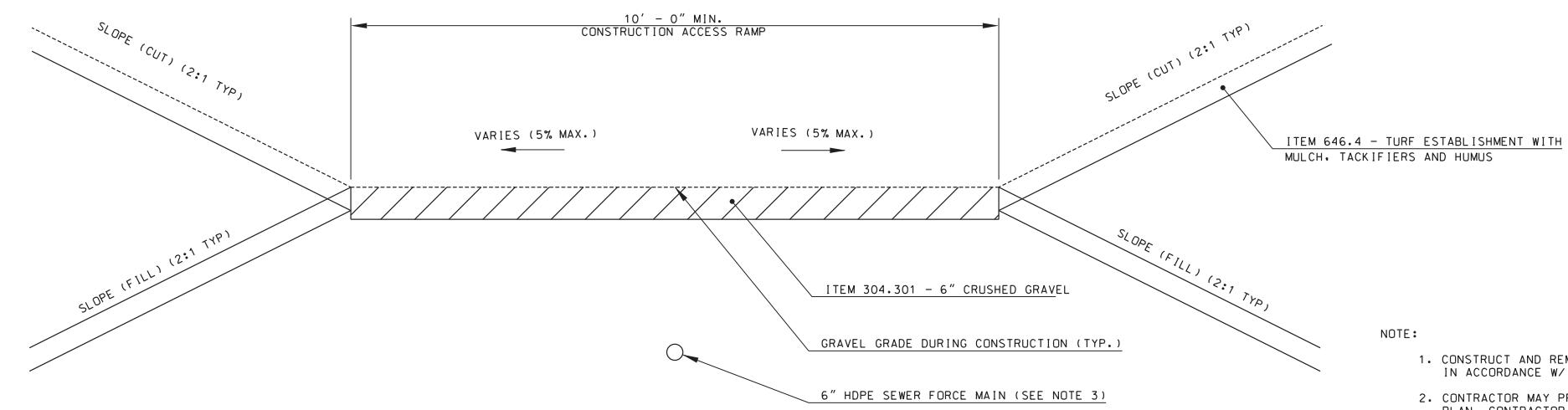
STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
9-1-2016	04_stdssymb2	16156	4	23

REVISIONS AFTER PROPOSAL					
					DESCRIPTION



TYPICAL SECTION - ACCESS FOR BRIDGE CONSTRUCTION
(ITEMS 500.0201 & 500.0202)

(NOT TO SCALE)

NOTE:

1. CONSTRUCT AND REMOVE ACCESS FOR BRIDGE CONSTRUCTION IN ACCORDANCE W/ ITEMS 500.0201 & 500.0202
2. CONTRACTOR MAY PROPOSE ALTERNATE ACCESS PLAN. CONTRACTOR IS RESPONSIBLE FOR ANY PERMITTING CHANGES, UTILITY IMPACTS, OR ADDITIONAL ROW, IF NECESSARY DUE TO ALTERNATE ACCESS PLAN. PLAN MUST BE APPROVED IN ADVANCE BY NHDOT.
3. CONTRACTOR TO PROTECT EXISTING 6" HDPE SEWER FORCE MAIN TO WEST OF NH 114. CONTRACTOR SHALL MAINTAIN MIN. 4' OF COVER OVER PIPE AT ALL TIMES (ITEM 500.0202).

SDR PROCESSED	NH DOT	DATE	DATE
NEW DESIGN	TJW	08/2017	DATE
SHEET CHECKED	DEM	DATE	08/2017
AS BUILT DETAILS		DATE	

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

ACCESS TYPICAL SECTION



DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
05_16156_TYP	16156	5	23

SUMMARY OF QUANTITIES (ESTIMATED)
THIS INFORMATION IS FOR BIDDING PURPOSES ONLY

DRAINAGE SUMMARY

DRAINAGE SUMMARY												
	202.41	202.42	207.3	5E3.5	585.3401	593.411	602.41190	603.00215	603.33212	603.99012	622.1	
REF. NO.	REMOVAL OF EXISTING PIPE 0-24" DIAMETER	REMOVAL OF EXISTING PIPE OVER 24" DIAMETER	UNCLASSIFIED CHANNEL EXCAVATION	RIPRAP, CLASS V	SIMULATED STREAMBED MATERIAL	GEOTEXTILE; PERM. CONTROL CL. 1, NON-WOVEN	CENTRIFUGALLY CAST CONCRETE LINER FOR 90" CMP	15" R.C. PIPE, 2000D	12" CORR. POLYETHYLENE END SECTION	12" TEMPORARY DRAIN PIPE	STEEL WITNESS MARKERS	REMARKS
	LF	LF	CY	CY	CY	SY	LF	LF	EA	LF	EA	
NH ROUTE 114								210	16			
B1												
B2	14	165	85	15	142			16			1	
B3	14	187	123	16	182						1	
E1	19											REMOVE 19' x 15" RCP
E2												
E3	21											REMOVE 21' x 15" RCP
T1								1	68			
T2												REMOVE 68' x 12" TEMP. DRAIN PIPE & END SECTION (SUBSIDIARY TO NOTE T1)
SUB-TOTAL	40	28	362	208	31	324	210	32	1	68	2	
ROUNDING	0	2	8	2	4	26	0	0	0	2	0	
TOTAL	40	30	370	210	35	350	210	32	1	70	2	

INCIDENTAL ITEMS			
ITEM NO.	ITEM	QUANTITY	UNIT
201.1	CLEARING AND GRUBBING (F)	0.1	A
201.881	INVASIVE SPECIES CONTROL TYPE I	350	SY
202.7	REMOVAL OF GUARDRAIL	390	LF
203.11	COMMON EXCAVATION - LRS	410	CY
203.55543	GUARDRAIL EAGRT OFFSET PLATFORM, TL3	1	U
203.601	EMBANKMENT IN PLACE	20	CY
206.19	COMMON STRUCTURE EXCAVATION EXPLORATORY	70	CY
304.32	CRUSHED GRAVEL FOR SHOULDER LEVELING	25	TON
606.012	W6X9 STEEL POST REPLACEMENTS FOR BEAM GUARDRAIL POSTS	15	EA
606.0122	W6X9 STEEL POST ASSEMBLIES FOR BEAM GUARDRAIL POSTS	15	EA
606.1254	BEAM GUARDRAIL (TERMINAL UNIT TYPE EAGRT, TL 3) (STEEL POST)	1	U
606.18001	31" W-BEAM GUARDRAIL WITH 8" OFFSET BLOCK (STEEL POST)	350	LF
606.34202	SINGLE FACED ASYMMETRICAL TRANSITION RAIL, RIGHT (STEEL POST)	2	U
606.417	PORTABLE CONCRETE BARRIER FOR TRAFFIC CONTROL	400	LF
606.91	RESETTING OR SETTING GUARDRAIL	25	LF
606.9513	TEMP. IMPACT ATTENUATION DEVICE (REDIRECTIVE) TEST LEVEL 3	4	U
615.034	RELOCATING TRAFFIC SIGN, TYPE C	1	U
618.61	UNIFORMED OFFICERS WITH VEHICLE	*	\$
618.7	FLAGGERS	250	HR
619.1	MAINTENANCE OF TRAFFIC	1	U
619.25	PORTABLE CHANGEABLE MESSAGE SIGN	2	U
621.2	RETROREFLECTIVE BEAM GUARDRAIL DELINEATOR	6	EA
621.31	SINGLE DELINEATOR WITH POST	4	EA
621.32	DOUBLE DELINEATOR WITH POST	1	EA
632.0104	RETROREFLECTIVE PAINT PAVE. MARKING, 4" LINE	2300	LF
643.22	FERTILIZER FOR REFERTILIZATION	0.3	TON
645.3	EROSION STONE	350	TON
645.44	TEMPORARY SLOPE STABILIZATION, TYPE D (WILDLIFE FRIENDLY)	2450	SY
645.512	COMPOST SOCK FOR PERIMETER BERM	1100	LF
645.52	RYEGRASS FOR TEMPORARY EROSION CONTROL	50	LB
645.531	SILT FENCE	1100	LF
645.7	STORMWATER POLLUTION PREVENTION PLAN (SWPPP)	1	U
645.71	MONITORING SWPPP AND EROSION AND SEDIMENT CONTROLS	90	HR
646.4	TURF ESTABLISHMENT WITH MULCH, TACKIFIERS AND HUMUS	0.6	A
670.104	TEMPORARY PORTABLE LIGHTING	2	U
692.	MOBILIZATION	1	U
697.11	INVASIVE SPECIES CONTROL AND MANAGEMENT PLAN	1	U
697.31	PROJECT OPERATIONS PLAN	1	U
699.	MISCELLANEOUS TEMPORARY EROSION AND SEDIMENT CONTROL	*	\$
1010.15	FUEL ADJUSTMENT	*	\$

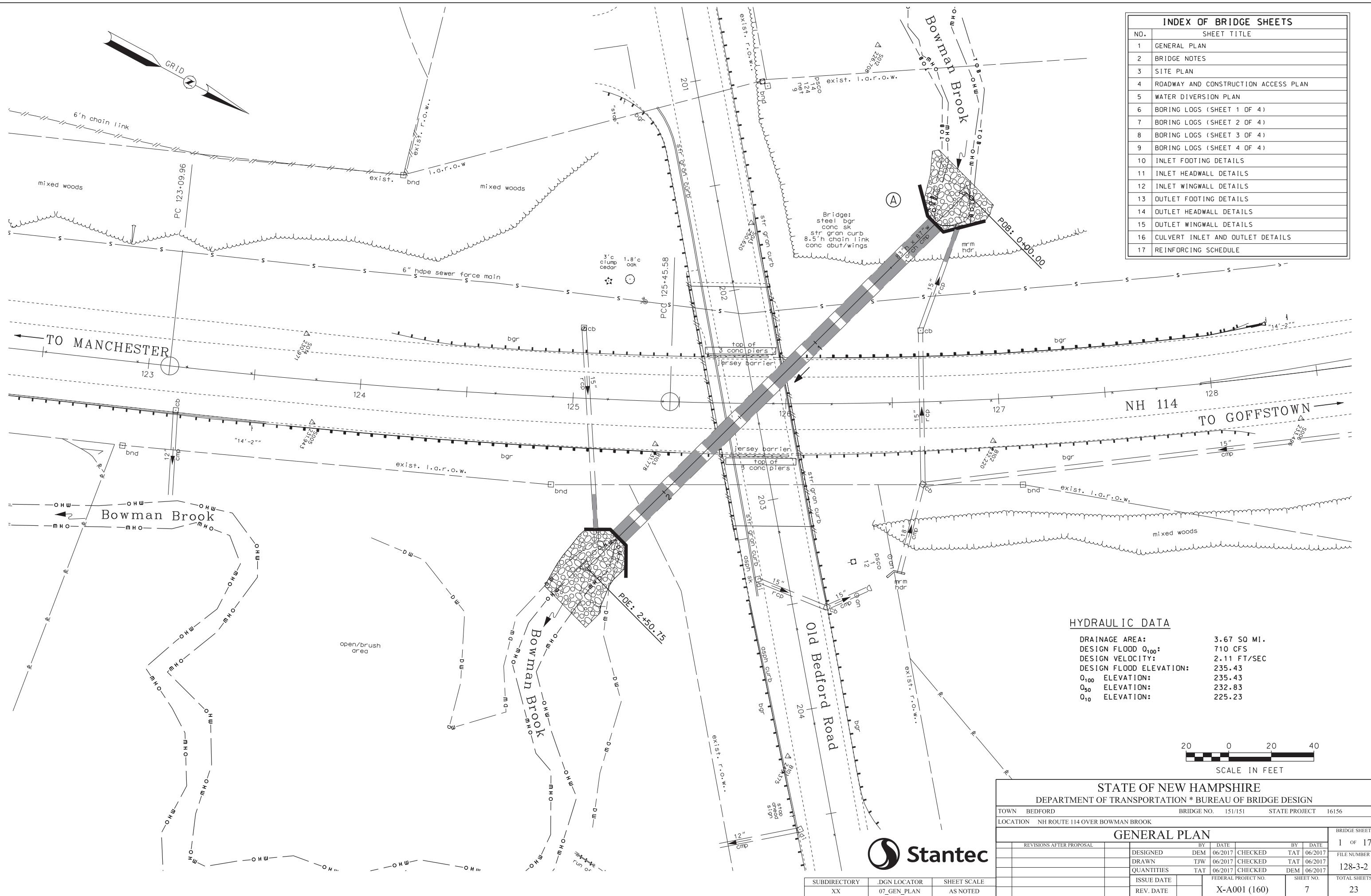
* NOT A BID ITEM

500.0201 - ACCESS FOR BRIDGE CONSTRUCTION				
SUBSIDIARY ITEMS				
ITEM NO.	ITEM	QUANTITY	UNIT	
203.1	COMMON EXCAVATION	144	CY	
203.601	EMBANKMENT-IN-PLACE	65	CY	
304.301	CRUSHED GRAVEL	36	CY	
NOTE: THIS LIST SHOULD NOT BE CONSIDERED TO BE A LIST OF ALL SUBSIDIARY WORK PRESENT IN THE PROJECT. REFER ALSO TO THE PROPOSAL, SPECIAL PROVISIONS AND THE STANDARD SPECIFICATIONS.				

ITEM 500.0202 - ACCESS FOR BRIDGE CONSTRUCTION				
SUBSIDIARY ITEMS				
ITEM NO.	ITEM	QUANTITY	UNIT	
203.1	COMMON EXCAVATION	90	CY	
203.601	EMBANKMENT-IN-PLACE	52	CY	
304.301	CRUSHED GRAVEL	23	CY	
NOTE: THIS LIST SHOULD NOT BE CONSIDERED TO BE A LIST OF ALL SUBSIDIARY WORK PRESENT IN THE PROJECT. REFER ALSO TO THE PROPOSAL, SPECIAL PROVISIONS AND THE STANDARD SPECIFICATIONS.				

PERMANENT CONSTRUCTION SIGN TABLE								
(INCLUDED IN ITEM NO. 619.1)								
SIGN NO.	DESCRIPTION	SIZE (ft)		SF NO. REQ.	TOTAL AREA (SF)	PORTABLE MOUNTS	U- CHANNEL POSTS	REMARKS
		W	H					
G20-2A	"END ROAD WORK"	4	2	8	4	32	4	BLACK/ORANGE
R50-1	"NH LAW WORK ZONE"	6	4	24	2	48	2	BLACK/WHITE
W20-1a	"ROAD WORK AHEAD"	4	4	16	2	32	2	BLACK/FLUORESCENT ORANGE
W20-1b	"ROAD WORK 500 FT"	4	4	16	2	32	2	BLACK/FLUORESCENT ORANGE
W20-1c	"ROAD WORK 1000 FT"	4	4	16	2	32	2	BLACK/FLUORESCENT ORANGE
W20-1e	"ROAD WORK 1/2 MILE"	4	4	16	2	32	2	BLACK/FLUORESCENT ORANGE

NOTE: The estimated quantities of "Permanent Controls" are hereby listed. The contractor is responsible for all "Operational Controls" required under section 619 of the NHDOT Specifications and the Manual of Uniform Traffic Control Devices (MUTCD), Part



DESIGN LOADS, MATERIALS AND SPECIFICATIONS

1. DESIGN LOADING: HL-93
2. DESIGN METHOD: LOAD AND RESISTANCE FACTOR DESIGN (LRFD)
3. SPECIFICATIONS: AASHTO 2014 LRFD BRIDGE DESIGN SPECIFICATIONS AS AMENDED
AASHTO BRIDGE CONSTRUCTION SPECIFICATIONS WITH INTERIMS
NHDOT 2016 STANDARD SPECIFICATIONS FOR ROAD & BRIDGE
CONSTRUCTION AS AMENDED
4. FOUNDATION DATA: REINFORCED CONCRETE FOOTINGS SUPPORTED ON BEDROCK WITH
ONE FOOT OF STRUCTURAL FILL. NOMINAL BEARING RESISTANCE
OF 12 TSF WITH A 0.45 RESISTANCE FACTOR. NOMINAL
SLIDING RESISTANCE (TAN δ) OF 34 DEGREES WITH A 0.8
RESISTANCE FACTOR.
5. REINFORCING STEEL: AASHTO M31 (ASTM A615) GRADE 60
6. CONCRETE:
FOOTINGS:
ITEM 520.213, CONCRETE CLASS B, FOOTINGS (ON SOIL) (F)
3000 psi
HEADWALLS AND WINGWALLS:
ITEM 520.12, CONCRETE CLASS A, ABOVE FOOTINGS (F)
3000 psi

GENERAL NOTES

1. EXISTING BRIDGE PLANS ARE AVAILABLE ON-LINE IN THE BID PACKAGE ON THE INVITATION TO BID WEB PAGE DURING THE BIDDING PERIOD. AFTER THE CONTRACT HAS BEEN AWARDED, A SET OF EXISTING PLANS WILL BE FORWARDED TO THE CONTRACTOR UPON REQUEST.
2. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS OF THE EXISTING STRUCTURES AND SHALL BE PREPARED TO MAKE ANY ADJUSTMENTS REQUIRED TO PROPERLY COMPLETE THE CONSTRUCTION OF PROPOSED STRUCTURES.
3. THE CONTRACTOR SHALL TAKE ALL NECESSARY MEASURES TO ENSURE THAT DEBRIS DOES NOT FALL INTO THE WATERWAY. THE WATER LEVEL OF THE BOWMAN BROOK MAY VARY FROM WHAT WHICH IS SHOWN. ALL COSTS FOR PROTECTIVE STRUCTURES OR SHIELDING REQUIRED OR ORDERED SHALL BE PAID UNDER ITEM 202.42 AND SHALL INCLUDE ERECTION, MAINTENANCE, AND REMOVAL OF TEMPORARY STRUCTURES OR OTHER SUCH METHODS AS APPROVED BY THE ENGINEER.
4. NO SCAFFOLDS SHALL BE ERECTED OR OPERATIONS CONDUCTED IN THE WATERWAY, UNLESS APPROVED BY THE ENGINEER.
5. NO EXISTING MONUMENTS, BOUNDS, OR BENCHMARKS SHALL BE DISTURBED WITHOUT FIRST MAKING PROVISIONS FOR RELOCATION.
6. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED $3\frac{1}{4}$ ", UNLESS NOTED OTHERWISE.
7. SHEAR KEYS SHALL BE 3" HIGH BY ONE-THIRD THE THICKNESS OF THE WALL, CENTERED, UNLESS NOTED OTHERWISE.
8. FOR BORING NOTES SEE BRIDGE SHEET 6.
9. FOR HYDRAULIC DATA SEE BRIDGE SHEET 1.

CONSTRUCTION ACCESS NOTES

1. ITEM 500.0201 AND 500.0202, ACCESS FOR BRIDGE CONSTRUCTION, SHALL INCLUDE THE DESIGN, CONSTRUCTION, MAINTENANCE, AND REMOVAL OF ALL TEMPORARY ACCESS MEASURES SELECTED BY THE CONTRACTOR FOR THE BRIDGE CONSTRUCTION, INCLUDING ACCESS ACROSS BOWMAN BROOK BETWEEN THE HEADWALLS AND WINGWALLS AND ACCESS FROM THE ROADWAY DOWN TO THE BROOK LEVEL AT BOTH HEADWALLS. SEE THE SPECIAL PROVISION FOR ITEMS 500.0201 AND 500.0202 FOR ADDITIONAL INFORMATION.
2. TEMPORARY FILLS CONSTRUCTED ACROSS WETLAND AREAS UNDER THIS ITEM SHALL BE LOCATED WITHIN THE ALLOWABLE WETLAND IMPACT AREAS SHOWN ON THE WETLAND PERMIT AND WITHIN THE EASEMENTS SHOWN ON THE SITE PLAN. CLEAN STONE WITH UNDERLYING GEOTEXTILE SHALL BE USED FOR THE TEMPORARY FILLS WITHIN THE WETLAND IMPACT AREAS. ALL COSTS SHALL BE SUBSIDIARY TO ITEM 500.0201 AND 500.0202.

REINFORCEMENT NOTES

1. REINFORCEMENT IN THE BOTTOM OF FOOTINGS SHALL HAVE 3" MINIMUM CLEAR COVER. ALL OTHER REINFORCEMENT SHALL HAVE A 2 $\frac{1}{2}$ " MINIMUM CLEAR COVER, UNLESS OTHERWISE NOTED.
2. PLACE REINFORCING STEEL TO AVOID WEEPERS.
3. REINFORCING LEGEND: SP = SPACE, SPL = SPLICE, FS = FAR SIDE, NS = NEAR SIDE. BOT = BOTTOM, ALT = ALTERNATING, DOW = DOWEL.
4. REINFORCING SHALL BE PAID UNDER ITEM 544, REINFORCING STEEL (F).

HEADWALL AND WINGWALL NOTES

1. WEEPERS SHALL BE PLACED SYMMETRICALLY 10'-0" APART AND CENTERED AT 12" ABOVE THE TOP OF FOOTING. WEEPERS SHALL BE 4" DIAMETER AND SLOPED TO DRAIN AT 12:1. ALL COSTS WILL BE SUBSIDIARY TO ITEM 520.12.
2. ITEM 538.2, BARRIER MEMBRANE, PEEL AND STICK - VERTICAL SURFACES (F), 2' WIDE, SHALL BE PLACED CENTERED OVER ALL VERTICAL CONSTRUCTION JOINTS WITH PROTECTION BOARD (SUBSIDIARY).
3. ITEM 534.3, WATER REPELLENT (SILANE-SILOXANE), SHALL BE APPLIED TO ALL EXPOSED CONCRETE SURFACES OF HEADWALLS AND WINGWALLS TO 1'-0" BELOW FILL LINES.

EXISTING CULVERT REMOVAL NOTES

1. ITEM 202.42., REMOVAL OF EXISTING PIPE, OVER 24" DIAMETER, UNLESS OTHERWISE SHOWN ON THE PLANS, SHALL INCLUDE THE FOLLOWING:
 - COMPLETE REMOVAL OF THE MITERED END PORTIONS OF THE EXISTING CULVERT TO THE LIMITS SHOWN ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.
2. DURING REMOVAL OPERATIONS, EXTREME CARE SHALL BE TAKEN NOT TO DAMAGE THE EXISTING CULVERT THAT IS TO REMAIN IN PLACE. ANY DAMAGE SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER AND REPAIRED AS DIRECTED, AT THE CONTRACTOR'S EXPENSE.
3. EXCAVATION, TEMPORARY EARTH SUPPORT AND GRADING, AND BACKFILL NOT INCLUDED IN OTHER ITEMS, BUT REQUIRED FOR REMOVAL OF THE EXISTING STRUCTURE SHALL BE SUBSIDIARY TO ITEM 202.42.

COFFERDAM NOTES

1. ALL COFFERDAM ITEMS COVERED UNDER SECTION 503 OF THE SPECIFICATIONS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NH. THE CONTRACTOR SHALL SUBMIT STAMPED WORKING DRAWINGS AND CALCULATIONS FOR DOCUMENTATION IN ACCORDANCE WITH 105.02.
2. THE COFFERDAM ITEMS ARE INCLUDED IN THE CONTRACT FOR THE PURPOSE OF SUPPORTING EXCAVATIONS FOR THE INLET AND OUTLET HEADWALLS AND WINGWALLS BELOW OVERLYING FACILITIES (e.g., EXISTING SEWER AND ROADWAY). EXCAVATION BACKSLOPES IN SOIL BELOW THE OVERLYING FACILITIES SHALL BE NO STEEPER THAN 1.5H:1V. FLATTER BACKSLOPES SHALL BE USED IF THE CONTRACTOR'S STABILITY CALCULATIONS INDICATE INSUFFICIENT SOIL SLOPE STABILITY AT 1.5H:1V.
3. THE LOCATION AND LIMITS OF THE COFFERDAMS DETAILED ON THE PLANS ARE SCHEMATIC AND NOT INTENDED FOR FINAL DESIGN OF THE COFFERDAM. THE COFFERDAM LIMITS AND LOCATION MAY BE ADJUSTED BY THE CONTRACTOR TO ACCOMMODATE THE CONTRACTOR'S MEANS AND METHODS OF CONSTRUCTION. THE COFFERDAM SHALL BE DESIGNED TO MEET THE REQUIREMENTS OF SECTIONS 503 AND 504, THE FOUNDATION NOTES AND ALL ENVIRONMENTAL PERMITS.
4. ALL COSTS ASSOCIATED WITH THE DESIGN, INSTALLATION, MAINTENANCE, AND REMOVAL OF THE COFFERDAM WILL BE PAID FOR UNDER COFFERDAM ITEMS 503.201 AND 503.202. ALL DEWATERING COSTS FOR THE INLET AND OUTLET HEADWALL AND WINGWALL EXCAVATIONS WILL BE PAID UNDER ITEM 503.101.
5. COFFERDAMS THAT ARE CUT OFF AND LEFT IN PLACE AT THE CONTRACTOR'S CHOICE SHALL BE CUT OFF A MINIMUM OF 3 FEET BELOW FINAL GRADE. NO ADDITIONAL PAYMENT WILL BE MADE FOR COFFERDAMS THAT ARE CUTOFF AND LEFT IN PLACE.
6. ALL COSTS ASSOCIATED WITH THE RE-DESIGN AND RE-INSTALLATION OF COFFERDAMS DUE TO SUBSURFACE CONDITIONS ENCOUNTERED DURING THE COFFERDAM INSTALLATION THAT ARE DIFFERENT FROM WHAT THE COFFERDAM DESIGNER ASSUMED AND/OR INTERPRETED FROM THE AVAILABLE SUBSURFACE INFORMATION SHALL BE SUBSIDIARY TO THE ASSOCIATED COFFERDAM ITEM. SECTION 102.05 SHALL BE REFERENCED FOR ADDITIONAL INFORMATION REGARDING THE USE OF SUBSURFACE INFORMATION PROVIDED IN THE CONTRACT.

WATER DIVERSION STRUCTURE NOTES

1. THE WATER DIVERSION STRUCTURE ITEM IS INCLUDED IN THE CONTRACT FOR THE PURPOSE OF DIVERTING BOWMAN BROOK AND ANY SURFACE WATER FROM:
 - INLET AND OUTLET HEADWALL EXCAVATIONS
 - WINGWALL EXCAVATIONS
 - PIPE LINER INSTALLATION
 AND DEWATERING FROM:
 - INLET AND OUTLET HEADWALL EXCAVATIONS
 - WINGWALL EXCAVATIONS
 - PIPE LINER INSTALLATION
 THIS SINGLE ITEM SHALL BE USED FOR BOTH THE INLET AND OUTLET LOCATIONS WITH A CONTRACT QUANTITY OF ONE UNIT. ALL COSTS ASSOCIATED WITH THE DESIGN, INSTALLATION, DEWATERING, MAINTENANCE, EARTH DIKES, TEMPORARY PIPES, STEEL SHEETING, PUMPING, TREATMENT OF PUMPED WATER, AND ALL OTHER MEASURES SELECTED BY THE CONTRACTOR TO COMPLETE THE WORK AND REMOVAL OF THE WATER DIVERSION WILL BE PAID FOR UNDER WATER DIVERSION STRUCTURE ITEM 503.101. THE CONTRACTOR SHALL SUBMIT A WATER DIVERSION PLAN IN ACCORDANCE WITH 503.3.1.2. THE SUBMITTAL SHALL INCLUDE THE PROPOSED METHOD OF DEWATERING AND THE METHOD OF DISPOSAL OF WATER PUMPED FROM THE EXCAVATIONS.
2. THE WATER DIVERSION SHALL BE DESIGNED TO ACCOMMODATE THE BOTTOM OF EXCAVATION GRADE INDICATED ON THE PLANS INCLUDING ANY AREAS WHERE THE ROCK EXCAVATION EXTENDS BELOW THE REQUIRED ELEVATION. SEE FOUNDATION NOTES FOR ADDITIONAL INFORMATION.
3. THE WATER DIVERSION STRUCTURE SHALL BE DESIGNED, CONSTRUCTED AND MAINTAINED IN A MANNER THAT MEETS THE REQUIREMENTS OF SECTION 503, 504, THE FOUNDATION NOTES, AND ALL APPLICABLE ENVIRONMENTAL REQUIREMENTS.
4. THE WATER LEVEL WITHIN THE HEADWALL AND WINGWALL EXCAVATIONS SHALL BE MAINTAINED BELOW THE BOTTOM OF FOOTING GRADE, SO THE FOOTING CONCRETE CAN BE PLACED IN THE DRY. DEWATERING SHALL BE CONTINUOUS UNTIL THE HEADWALLS AND WINGWALLS ARE BACKFILLED TO THE ELEVATION OF THE SURROUNDING WATER TABLE.

UTILITY NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING AND DETERMINING THE LOCATION AND SIZE OF ALL EXISTING UTILITIES, SHOWN AND NOT SHOWN, PRIOR TO CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES FOUND INTERFERING WITH THE PROPOSED CONSTRUCTION AND APPROPRIATE REMEDIAL ACTION SHALL BE TAKEN BEFORE PROCEEDING WITH THE WORK.
2. THE CONTRACTOR SHALL NOTIFY DIG-SAFE PRIOR TO CONSTRUCTION.
3. THE EXISTING 6" HDPE SEWER FORCE MAIN TO THE WEST (INLET SIDE) OF NH 114 SHALL BE PROTECTED THROUGHOUT CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR CONFIRMING THE LOCATION OF THE MAIN AND SHALL PROTECT AND USE EXTREME CARE WHILE MOVING EQUIPMENT AND MATERIALS OVER IT. A MINIMUM OF 4' OF COVER OVER THE PIPE SHALL BE MAINTAINED AT ALL TIMES.

SUMMARY OF BRIDGE QUANTITIES - BR. NO. 151/151

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT
209.201	GRANULAR BACKFILL (BRIDGE) (F)	380	CY
500.0201	ACCESS FOR BRIDGE CONSTRUCTION	1	U
500.0202	ACCESS FOR BRIDGE CONSTRUCTION	1	U
503.101	WATER DIVERSION STRUCTURE	1	U
503.201	COFFERDAMS	1	U
503.202	COFFERDAMS	1	U
504.1	COMMON BRIDGE EXCAVATION (F)	366	CY
504.2	ROCK BRIDGE EXCAVATION	273	CY
508.	STRUCTURAL FILL	105	CY
520.12	CONCRETE CLASS A, ABOVE FOOTINGS (F)	38	CY
520.213	CONCRETE CLASS B, FOOTINGS (ON SOIL) (F)	66	CY
520.32	GROUTING VOIDS IN BACKFILL MATERIAL	10	CY
534.3	WATER REPELLENT (SILANE/SILOXANE)	5	GAL
538.2	BARRIER MEMBRANE, PEEL AND STICK - VERTICAL SURFACES (F)	10	SY
541.4	PVC WATERSTOPS, NH TYPE 4 (F)	44	LF
544.	REINFORCING STEEL (F)	14567	LB
562.1	SILICONE JOINT SEALANT (F)	53	LF
1002.1	REPAIRS OR REPLACEMENTS AS NEEDED - BRIDGE STRUCTURES	*	\$

* NOT A BID ITEM

FOUNDATION NOTES

1. ALL FOOTINGS SHALL BE FOUNDED ON A MINIMUM 12 INCH THICK LAYER OF STRUCTURAL FILL, PLACED OVER THE ACCEPTABLE BEARING MATERIALS DESCRIBED BELOW. THE CONTRACTOR MAY SUBSTITUTE UP TO 12 INCHES OF CLEAN STONE STRUCTURAL FILL FOR THE CRUSHED GRAVEL STRUCTURAL FILL IN ACCORDANCE WITH 508.2.1.3 AT NO COST TO THE DEPARTMENT.
2. THE EXISTING MISCELLANEOUS FILL, THE NATURAL GLACIAL OUTWASH DEPOSIT, AND BEDROCK INCLUDING ANY WEATHERED AND FRACTURED BEDROCK ARE ACCEPTABLE FOR SUPPORT OF THE PROPOSED FOOTINGS FOR THE INLET AND OUTLET HEADWALLS AND WINGWALLS. EXCAVATION OF THESE MATERIALS BELOW THE SPECIFIED STRUCTURAL FILL THICKNESS IS NOT REQUIRED. ANY TOPSOIL, WOOD, OR OTHER UNSUITABLE MATERIALS ENCOUNTERED BELOW THE PROPOSED BOTTOM OF STRUCTURAL FILL GRADE SHALL BE EXCAVATED AND REPLACED WITH STRUCTURAL FILL, AS DIRECTED.
3. THE EXCAVATION TO FINAL GRADE AND THE CONTROL OF WATER SHALL BE CONDUCTED IN ACCORDANCE WITH SECTIONS 503 AND 504, AND IN A MANNER THAT PREVENTS DISTURBANCE OF THE FOUNDATION SUPPORT MATERIALS. PUMPING EQUIPMENT SHALL BE PROPERLY FILTERED TO PREVENT LOSS OF FINES. ANY DISTURBED AREAS SHALL BE OVER-EXCAVATED AND REPLACED WITH STRUCTURAL FILL AT THE CONTRACTOR'S EXPENSE. SUMP AREAS SHALL BE LOCATED OUTSIDE A 1H:2V SUPPORT LIMIT BELOW THE ABUTMENT AND WINGWALL FOOTINGS.
4. FOR LOCATIONS REQUIRING ROCK REMOVAL, THE REQUIRED ELEVATION FOR ROCK REMOVAL SHALL BE 12 INCHES BELOW THE FOOTING TO ACCOMMODATE THE 12 INCHES OF STRUCTURAL FILL. ANY ROCK REMOVED BELOW AN ELEVATION ONE FOOT LOWER THAN THE REQUIRED ELEVATION WILL BE CONSIDERED AS EXCESS REMOVAL AND WILL NOT BE PAID. NO PAYMENT WILL BE MADE FOR STRUCTURAL FILL THAT IS REQUIRED TO REPLACE EXCESS ROCK REMOVAL.
5. FRACTURES OR SEAMS IN THE BEDROCK SURFACE EXPOSED AT THE BOTTOM OF THE FOUNDATION EXCAVATION SHALL BE CLEANED AND GROUTED IN ACCORDANCE WITH 504.3.2, OR CHINKED WITH CLEAN STONE FOR STRUCTURAL FILL AS DIRECTED.
6. PROTRUDING COBBLES AND BOULDERS ENCOUNTERED AT THE FINAL EXCAVATION LEVEL SHOULD BE EITHER REMOVED AND REPLACED WITH STRUCTURAL FILL OR SPLIT TO PROVIDE A LEVEL SURFACE.

PIPE LINING NOTES

1. THE WORK SHALL CONSIST OF THE REPAIR OF THE CULVERT BY THE INSTALLATION OF A CEMENTITIOUS LINING CENTRIFUGALLY CAST IN PLACE FOR THE WATERPROOFING, SEALING, STRUCTURAL REINFORCEMENT AND CORROSION PROTECTION OF EXISTING CORRODED STEEL CULVERT PIPE. THE CENTRIFUGALLY CAST CONCRETE LINER SHALL EXTEND OVER THE SPECIFIED LENGTH FORMING A CONTINUOUS CONCRETE PIPE WITHIN A PIPE.
2. FOR ITEM 602.41190 CENTRIFUGALLY CAST CONCRETE LINER FOR 90" CMP, THE APPLICATION THICKNESS SHALL BE A MINIMUM OF 2", UNLESS THE STRUCTURAL CALCULATIONS SHOW A NEED FOR EVEN GREATER THICKNESS. SEE SPECIAL PROVISIONS FOR DETAILED REQUIREMENTS.
3. USE ITEM 520.32 TO GROUT ANY VOIDS FOUND IN THE BACKFILL MATERIAL SURROUNDING THE EXISTING CULVERT PRIOR TO INSTALLING THE CONCRETE LINER. SEE SPECIAL PROVISIONS FOR DETAILED REQUIREMENTS.

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN

TOWN	BEDFORD	BRIDGE NO.	151/151	STATE PROJECT	16156
LOCATION	NH ROUTE 114 OVER BOWMAN BROOK				
BRIDGE NOTES					BRIDGE SHEET
					2 of 17
					FILE NUMBER
					128-3-2
					TOTAL SHEETS

HEADWALL AND WINGWALL NOTES

1. WEEPERS SHALL BE PLACED SYMMETRICALLY 10'-0" APART AND CENTERED AT 12" ABOVE THE TOP OF FOOTING. WEEPERS SHALL BE 4" DIAMETER AND SLOPED TO DRAIN AT 12:1. ALL COSTS WILL BE SUBSIDIARY TO ITEM 520.12.
2. ITEM 538.2, BARRIER MEMBRANE, PEEL AND STICK - VERTICAL SURFACES (F), 2' WIDE, SHALL BE PLACED CENTERED OVER ALL VERTICAL CONSTRUCTION JOINTS WITH PROTECTION BOARD (SUBSIDIARY).
3. ITEM 534.3, WATER REPELLENT (SILANE-SILOXANE), SHALL BE APPLIED TO ALL EXPOSED CONCRETE SURFACES OF HEADWALLS AND WINGWALLS TO 1'-0" BELOW FILL LINES.

HEADWALL AND WINGWALL NOTES

1. WEEPERS SHALL BE PLACED SYMMETRICALLY 10'-0" APART AND CENTERED AT 12" ABOVE THE TOP OF FOOTING. WEEPERS SHALL BE 4" DIAMETER AND SLOPED TO DRAIN AT 12:1. ALL COSTS WILL BE SUBSIDIARY TO ITEM 520.12.

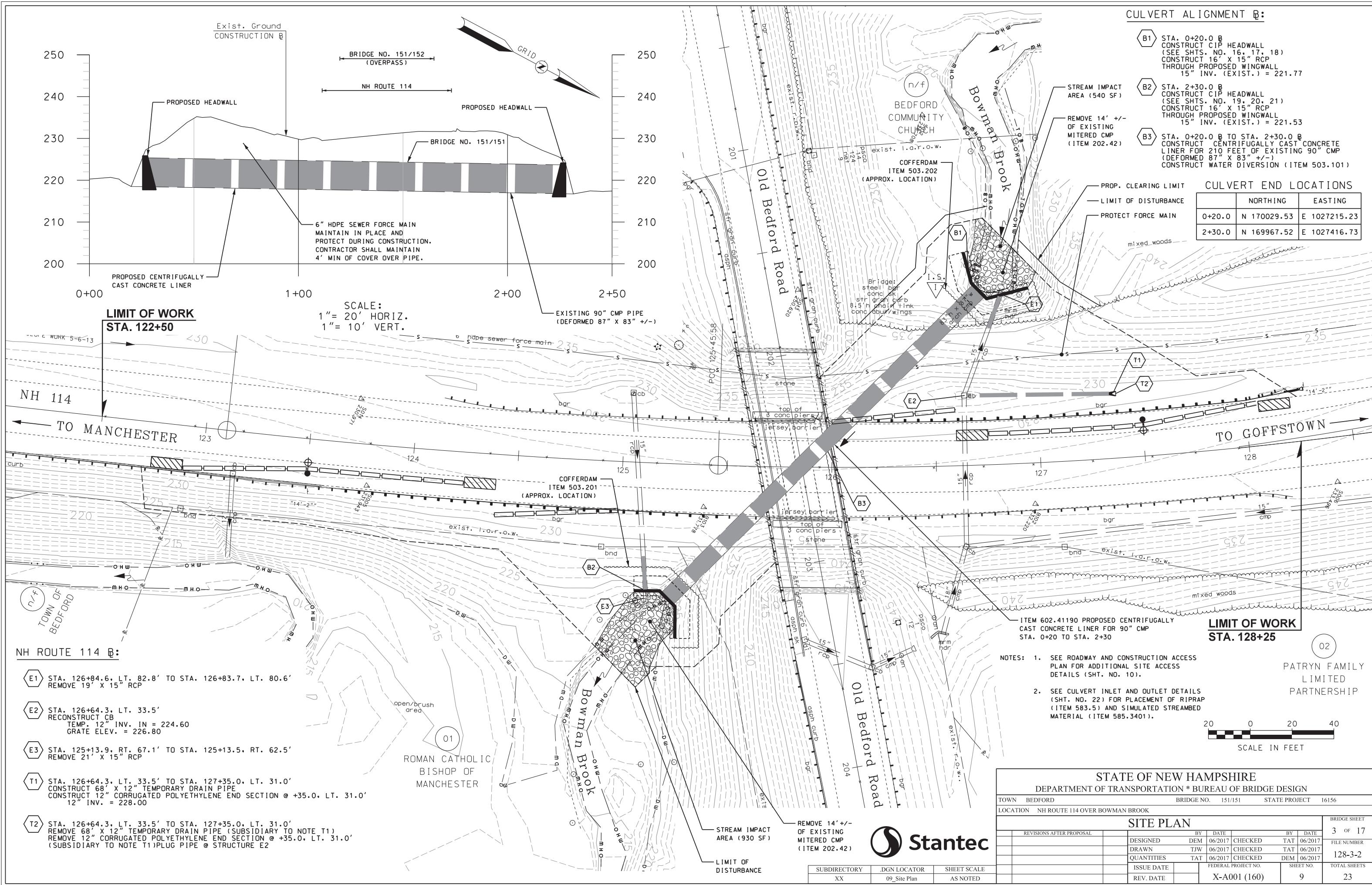
2. ITEM 538.2, BARRIER MEMBRANE, PEEL AND STICK - VERTICAL SURFACES (F), 2' WIDE, SHALL BE PLACED CENTERED OVER ALL VERTICAL CONSTRUCTION JOINTS WITH PROTECTION BOARD (SUBSIDIARY).

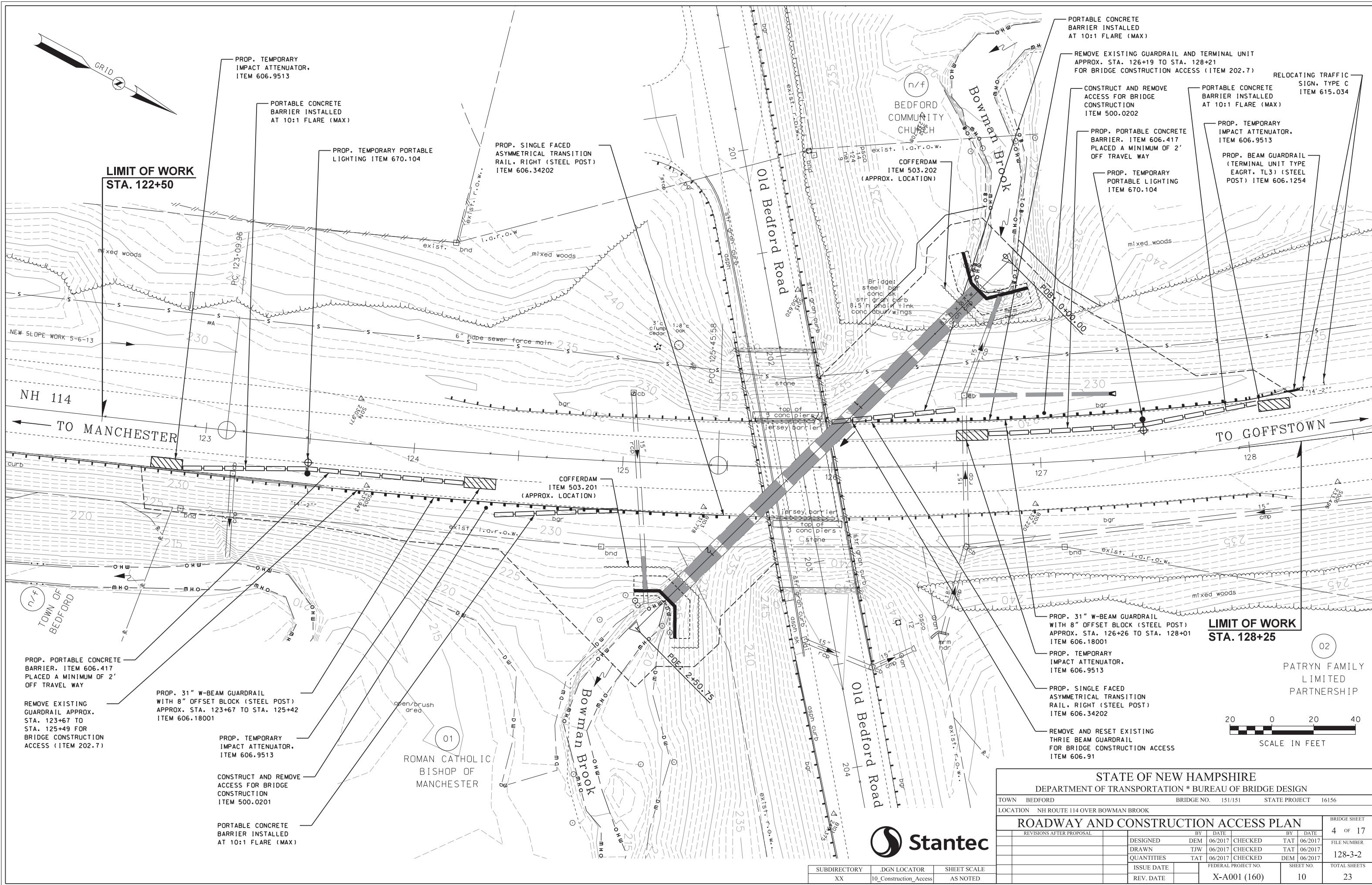
3. ITEM 534.3, WATER REPELLENT (SILANE-SILOXANE), SHALL BE APPLIED TO ALL EXPOSED CONCRETE SURFACES OF HEADWALLS AND WINGWALLS TO 1'-0" BELOW FILL LINES.

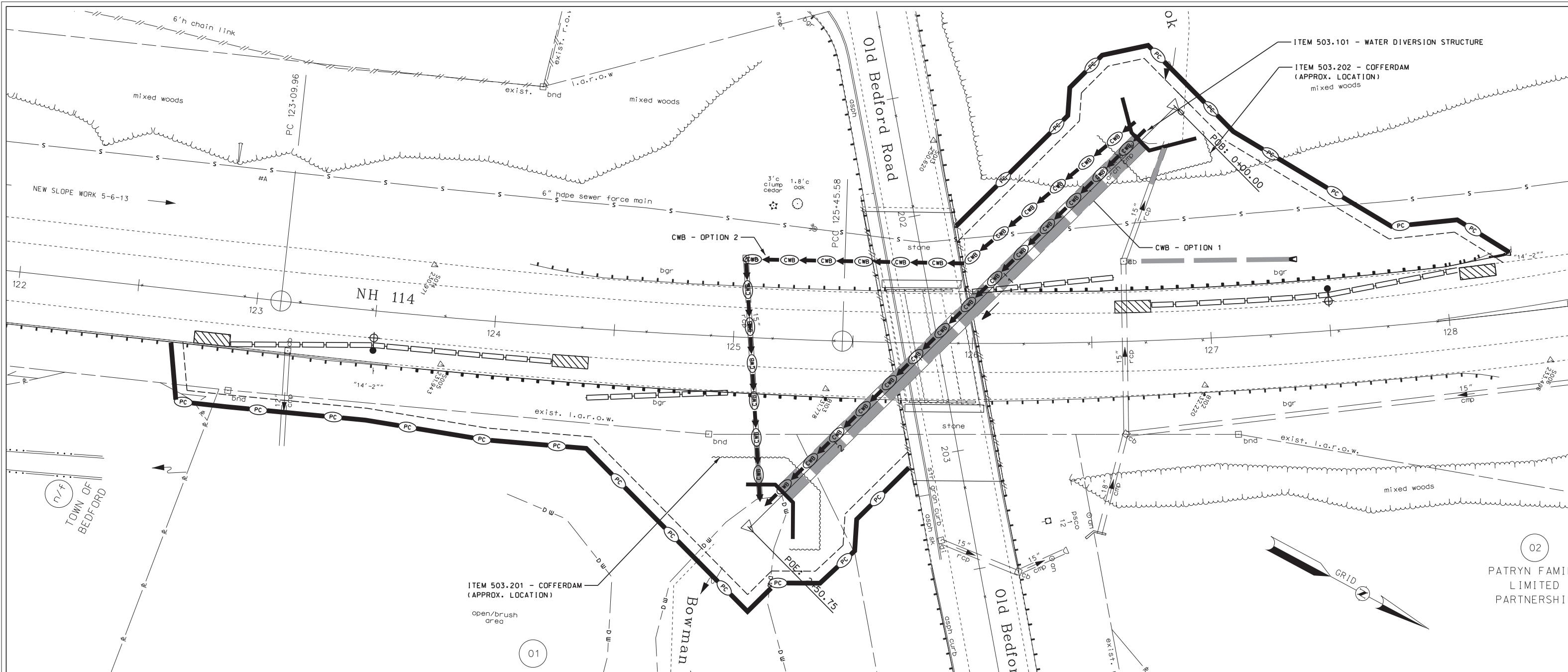
4. REINFORCING SHALL BE PAID UNDER ITEM 544, REINFORCING STEEL (F).

5. REINFORCING LEGEND: SP = SPACE, SPL = SPLICE, FS = FAR SIDE, NS = NEAR SIDE. BOT = BOTTOM, ALT = ALTERNATING, DOW = DOWEL.

6. REINFORCING SHALL BE PAID UNDER ITEM 544, REINFORCING STEEL (F).







EROSION CONTROL PLAN LEGEND

PERIMETER CONTROL

SILT FENCE
EROSION CONTROL MIX BERM
EROSION CONTROL MIX SOX
TURBIDITY CURTAIN
SHEET PILE
COFFER DAM

NATURAL BUFFER/PERIMETER CONTROL

SILT FENCE
EROSION CONTROL MIX BERM
EROSION CONTROL MIX SOX
TURBIDITY CURTAIN
SHEET PILE
COFFER DAM

CHANNEL PROTECTION

STONE CHECK DAMS
STRAW WATTERS
CHANNEL MATTING
CLASS D EROSION STONE
CLASS C STONE

CLEAN WATER BYPASS

PUMP THROUGH PIPE
DRAIN THROUGH PIPE OR CHANNEL

NOTE

1. CULVERT REHABILITATION SHALL BE DONE DURING LOW FLOW PERIODS.
2. INSTALL PERIMETER CONTROLS ALONG PERIMETER OF DISTURBED AREA.
3. INSTALL WATER DIVERSION STRUCTURE.
4. THE CONTRACTOR SHALL PROVIDE FOR SUMPS AND WELL POINTS WITH TEMPO PUMPING AS REQUIRED TO INSTALL THE HEADWALLS AND PIPE LINING. THE CONTRACTOR SHALL PUMP TO SEDIMENT CONTROL BASINS, SEDIMENT BAGS, SIMILAR MEASURES DURING Dewatering OPERATIONS.
5. REMOVE UPSTREAM AND DOWNSTREAM MITERED PORTIONS OF EXISTING CMP.
6. INSTALL HEADWALLS AT RELOCATED INLET AND OUTLET.
7. REHABILITATE PIPE.
8. GRADE AND CONSTRUCT UPSTREAM AND DOWNSTREAM STONE APRONS.
9. DIRECT FLOW THROUGH NEWLY LINED PIPE.
10. ALL Dewatering ASSOCIATED WITH CONSTRUCTION OF THE RETAINING WALL AND REHABILITATION OF THE CULVERT SHALL BE SUBSIDIARY TO ITEM 503

NOTE: THIS SHEET PROVIDES A TYPICAL CONSTRUCTION DEWATERING AND FLOW CONTROL PLAN. THE CONTRACTOR SHALL SUBMIT DRAWINGS AND DETAILS SHOWING MATERIALS TO BE USED, PROPOSED METHOD OF CONSTRUCTION, AND OTHER DETAILS LEFT OPEN TO CHOICE OR NOT FULLY SHOWN ON THE PLANS. DRAWINGS SHALL BE SUBMITTED FOR DOCUMENTATION IN ACCORDANCE WITH SECTION 105.02 OF THE NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE DESIGN.



SCALE IN FEET

STATE OF NEW HAMPSHIRE

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN

DEPARTMENT OF TRANSPORTATION - BUREAU OF BRIDGE DESIGN

114 OVER BOWMAN BROOK WATER DIVERSION PLAN

 Stantec		WATER DIVERSION PLAN						5 OF 17	
		REVISIONS AFTER PROPOSAL		BY	DATE	BY	DATE	FILE NUMBER	
		DESIGNED	DEM	06/2017	CHECKED	TAT	06/2017	128-3-2	
		DRAWN	TJW	06/2017	CHECKED	TAT	06/2017		
		QUANTITIES	TAT	06/2017	CHECKED	DEM	06/2017		
		ISSUE DATE		FEDERAL PROJECT NO.		SHEET NO.		TOTAL SHEETS	
		REV. DATE		X-A001 (160)		11		23	
SUBDIRECTORY	.DGN LOCATOR	SHEET SCALE							
XX	11_WDiv_Plan	AS NOTED							

BORING NO. B01

BORING NO. B02

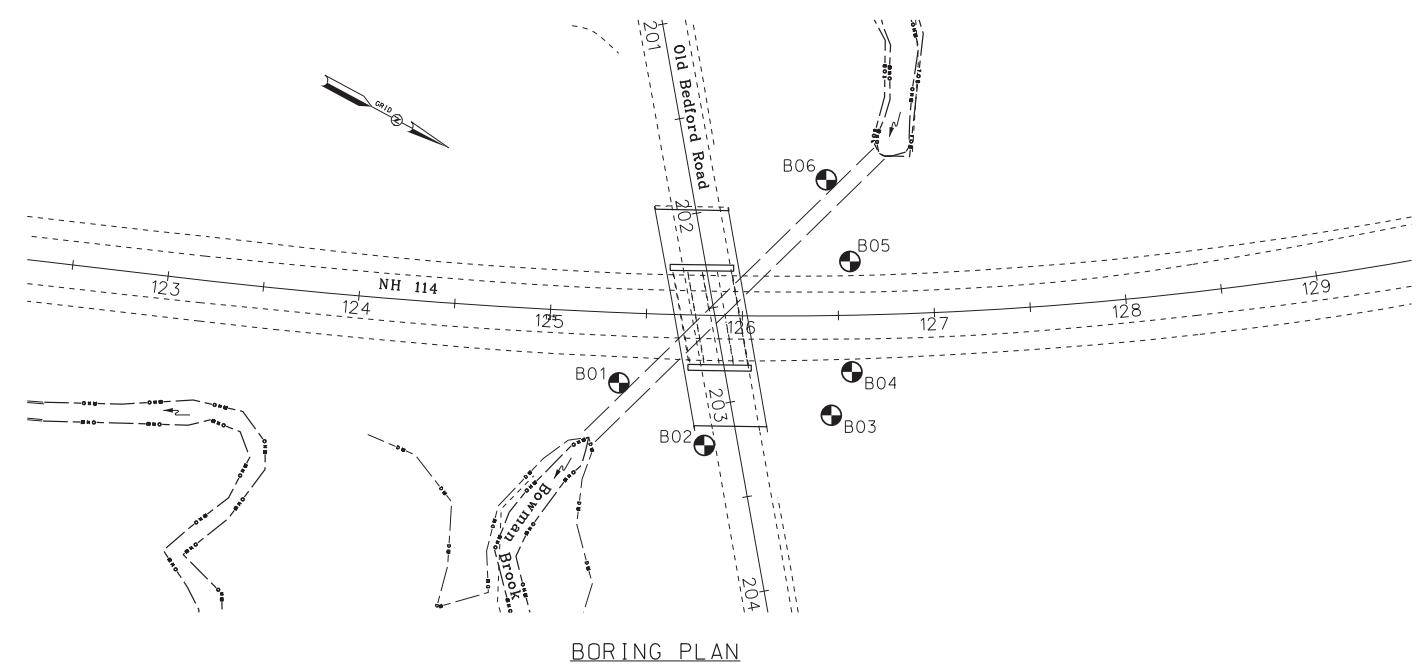
BORING NO. B02

(CONTINUED.)

TEST BORING REPORT							BORING NO. B02
STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION							SHEET NO. 2 OF 2
MATERIALS & RESEARCH BUREAU - GEOTECHNICAL SECTION							STA. OFF
PROJECT NAME BEDFORD 16156			BRIDGE NO. N/A		BASELINE NH Route 114		ELEVATION (ft) 250.1
DESCRIPTION Culvert Replacement NH 114			FIELD CLASSIFICATION AND REMARKS				STRAT. SYM.
DEPTH (ft)	STRATUM CHANGE (ft)		BLOWS PER 0.5 ft	SAMPLE NUMBER	SAMPLER RECOVERY (ft) [%]	DEPTH RANGE (ft)	
	DEPTH	ELEVATION					
- 30	31.1	219.0	4 14 17/0.1	S7	0.7 [64]	30.0 31.1	-GLACIAL OUTWASH-
- 35				C1	4.8 [100]	31.1 35.9	-APPROXIMATE BEDROCK SURFACE-
- 40							Bottom of Exploration @ 35.9 ft (El. 214.2)
- 45							
- 50							
- 55							
- 60							
- 65							

BORING NOTES:

1. FOR BORINGS B01 THROUGH B06, THE NHDOT PERFORMED SUBSURFACE INVESTIGATIONS AT THE SITE IN FEBRUARY 2011. ADDITIONAL BORING LOGS AND GEOTECHNICAL INFORMATION IS AVAILABLE ON-LINE ON THE INVITATION TO BID WEBPAGE AT WWW.NH.GOV/DOT IN THE SPECIFIC PROJECT'S PROPOSAL PACKAGE. ADDITIONAL BORINGS FROM THE 1964 STATE PROJECT P4988 ARE SHOWN ON BRIDGE SHEET 9.
2. NORTHING AND EASTING COORDINATES REFERENCE THE NORTH AMERICAN DATUM 1983/1986 AND ELEVATIONS REFERENCE THE NATIONAL GEODETIC VERTICAL DATUM OF 1929.
3. SUBSURFACE CONDITIONS ARE KNOWN ONLY AT THE EXPLORATION LOCATIONS AND COULD VARY AT OTHER LOCATIONS ON THE SITE.
4. GROUNDWATER LEVELS SHOWN ON THE LOGS REPRESENT THE CONDITIONS AT THE TIMES OF MEASUREMENT AND COULD CHANGE IN RESPONSE TO SEVERAL FACTORS INCLUDING PRECIPITATION AND TEMPERATURE.



BORING PLATE

SCALE: 1"=20'

 Stantec

STATE OF NEW HAMPSHIRE					
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN					
TOWN	BEDFORD	BRIDGE NO.	151/151	STATE PROJECT	16156
LOCATION	NH ROUTE 114 OVER BOWMAN BROOK				
BORING LOGS (SHEET 1 OF 4)					
REVISIONS AFTER PROPOSAL		BY	DATE	BY	DATE
		DESIGNED	DEM 06/2017	CHECKED	TAT 06/2017
		DRAWN	TJW 06/2017	CHECKED	TAT 06/2017
		QUANTITIES	TAT 06/2017	CHECKED	DEM 06/2017
E	ISSUE DATE	FEDERAL PROJECT NO.		SHEET NO.	TOTAL SHEETS
	REV. DATE	X-A001(160)		12	23

BORING NO. B03

BORING NO. B04



STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN							
TOWN	BEDFORD	BRIDGE NO.	151/151	STATE PROJECT	16156		
LOCATION	NH ROUTE 114 OVER BOWMAN BROOK						
BORING LOGS (SHEET 2 OF 4)						BRIDGE SHEET 7 OF 17	
REVISIONS AFTER PROPOSAL		BY	DATE	BY	DATE	FILE NUMBER	
		DESIGNED	DEM	06/2017	CHECKED	TAT	06/2017
		DRAWN	TJW	06/2017	CHECKED	TAT	06/2017
		QUANTITIES	TAT	06/2017	CHECKED	DEM	06/2017
		ISSUE DATE		FEDERAL PROJECT NO.		SHEET NO.	TOTAL SHEETS
		REV. DATE		X-A001 (160)		13	23

BORING NO. B05

TEST BORING REPORT											
STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION MATERIALS & RESEARCH BUREAU - GEOTECHNICAL SECTION											
PROJECT NAME BEDFORD 16156					BRIDGE NO. N/A						
DESCRIPTION Culvert Replacement NH 114											
GROUNDWATER				EQUIPMENT		SAMPLER		CASING CORE			
DATE	TIME	DEPTH (ft)	ELEV. (ft)	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE:	S	NW	NX		
2/11/11	11:30 am	4.3	222.8	2.5	7.8	SIZE I.D. (in):	1.375	3	1.875		
						HAMMER WT. (lb):	140	DRILL RIG			
						HAMMER FALL (in):	30	HAMMER TYPE: CME 45-C Track rig			
						EAST/NORTH (ft):	1027261/170057				
DEPTH (ft)	STRATUM CHANGE (ft)	BLOWS PER 0.5 ft	SAMPLE NUMBER	SAMPLER RECOVERY (ft) (%)	DEPTH RANGE (ft)	FIELD CLASSIFICATION AND REMARKS				STRATUM SYMBOL	
- 0	0.4	226.7	1	1.3 [65]	0.0	Dark brown, loamy TOPSOIL, occasional root fragments, frozen to 0.3'					
	2.5	224.6	2	14	2.0	Medium dense, yellowish brown, MEDIUM-FINE SAND, trace fine gravel, occasional very severely weathered rock fragments					
			7	S1 (SW)		-FILL-					
- 5					3.0	-APPROXIMATE BEDROCK SURFACE- Advanced boring with roller bit through very severely weathered bedrock from 2.5 to 3.0'					
				C1	4.6 [96]		Very hard, moderately weathered, moderately to extremely fractured, grey, coarse grained, GRANITE. Fractures shallow to moderately dipping. Oxidation staining present on most fracture surfaces RQD: 2.4 / 4.8 = 50%				
					7.8	Bottom of Exploration @ 7.8 ft (El. 219.3)					
- 10											
- 15											
- 20											
- 25											
Sampler Identification				COHESIVE SOILS		NON-COHESIVE SOILS		Soil Descriptions		Proportion	
S Standard Split Spoon	Blows/foot	Consistency	Blows/foot	Density	Capitalized Soil Name	Major Component					
SL Large Spoon (O.D. = 3 in)	0 - 1	Very Soft	0 - 4	Very Loose	Lower Case Adjective	35% - 50%					
T Thin Wall Tube	2 - 4	Soft	5 - 10	Loose	Some	20% - 35%					
U Undisturbed Piston	5 - 8	Medium Stiff	11 - 24	Medium Dense	Little	10% - 20%					
O Open End Rod	9 - 15	Stiff	25 - 50	Dense	Trace	1% - 10%					
A Auger Flight	16 - 30	Very Stiff	> 50	Very Dense							
C Core Barrel	31 - 60	Hard	WOR - Weight of Rod	WOR - Weight of Hammer							
NR Not Recorded	> 60	Very Hard			ENGLISH						

BORING NO. B06

TEST BORING REPORT											
STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION MATERIALS & RESEARCH BUREAU - GEOTECHNICAL SECTION											
PROJECT NAME BEDFORD 16156					BRIDGE NO. N/A						
DESCRIPTION Culvert Replacement NH 114											
GROUNDWATER				EQUIPMENT		SAMPLER		CASING CORE			
DATE	TIME	DEPTH (ft)	ELEV. (ft)	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE:	S	NW	NX		
2/10/11	12:30 pm	6.5	221.7	9.7	15.6	SIZE I.D. (in):	1.375	3	1.875		
						HAMMER WT. (lb):	140	DRILL RIG			
						HAMMER FALL (in):	30	HAMMER TYPE: Automatic CME 45-C Track rig			
						EAST/NORTH (ft):	1027221/170031				
DEPTH (ft)	STRATUM CHANGE (ft)	BLOWS PER 0.5 ft	SAMPLE NUMBER	SAMPLER RECOVERY (ft) (%)	DEPTH RANGE (ft)	FIELD CLASSIFICATION AND REMARKS				STRATUM SYMBOL	
- 0	0	1	1	1.4 [70]	0.0	Medium dense, light olive brown, FINE SAND, little coarse-fine gravel, little silt, trace coarse sand, trace medium sand, occasional root fibers, frozen to 0.3'					
	2.5	225.7	4	7	2.0	-FILL-					
			8	S1 (SM)		Wash color change from olive brown to olive -GLACIAL OUTWASH-					
- 5				5	4.0	Loose, olive, FINE SAND, little silt, occasional thin layers olive FINE SAND, trace silt, occasional thin layers olive SILT					
				4	6.0	Advanced boring with roller bit through cobble from 7.0' to 7.4'					
- 10				3	9.7	Olive, MEDIUM-FINE SAND, trace coarse sand, trace silt, severely weathered rock fragments in spoon shoe -APPROXIMATE BEDROCK SURFACE-					
				15	218.5	Advanced boring with roller bit through very severely weathered bedrock from 9.7' to 11.7'					
- 15				62/0.2	9.0	Very hard, moderately weathered, moderately fractured to sound, grey, medium to coarse grained, GRANITE. Fractures shallow to moderately dipping RQD: 2.4 / 4.8 = 50%					
					11.0	Bottom of Exploration @ 15.8 ft (El. 212.4)					
- 20											
- 25											
Sampler Identification				COHESIVE SOILS		NON-COHESIVE SOILS		Soil Descriptions		Proportion	
S Standard Split Spoon	Blows/foot	Consistency	Blows/foot	Density	Capitalized Soil Name	Major Component					
SL Large Spoon (O.D. = 3 in)	0 - 1	Very Soft	0 - 4	Very Loose	Lower Case Adjective	35% - 50%					
T Thin Wall Tube	2 - 4	Soft	5 - 10	Loose	Some	20% - 35%					
U Undisturbed Piston	5 - 8	Medium Stiff	11 - 24	Medium Dense	Little	10% - 20%					
O Open End Rod	9 - 15	Stiff	25 - 50	Dense	Trace	1% - 10%					
A Auger Flight	16 - 30	Very Stiff	> 50	Very Dense							
C Core Barrel	31 - 60	Hard	WOR - Weight of Rod	WOR - Weight of Hammer							
NR Not Recorded	> 60	Very Hard			ENGLISH						

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN

TOWN **BEDFORD** BRIDGE NO. **151/151** STATE PROJECT **16156**

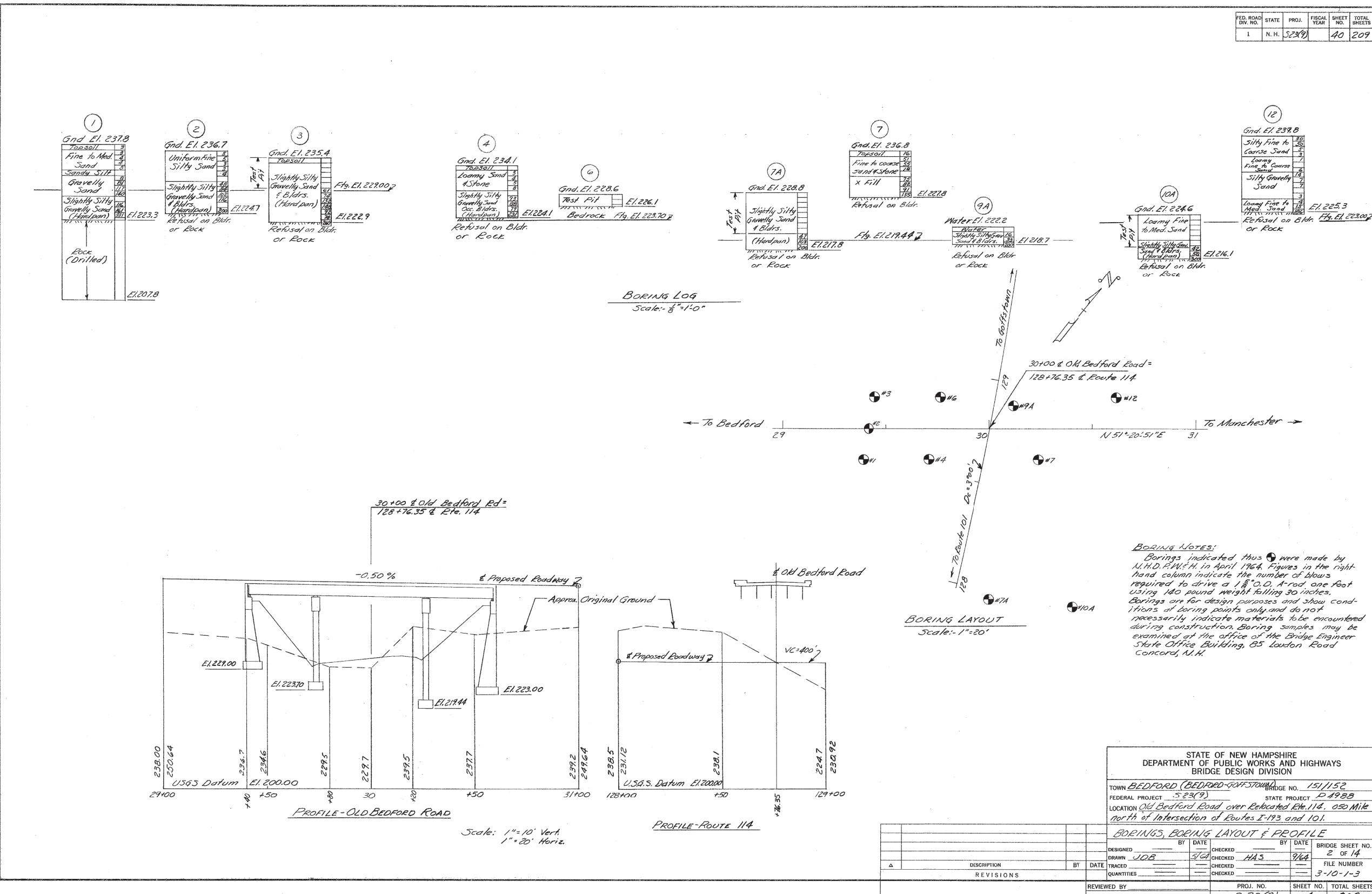
LOCATION **NH ROUTE 114 OVER BOWMAN BROOK**

BORING LOGS (SHEET 3 OF 4)

REVISIONS AFTER PROPOSAL			BY	DATE	BY	DATE
			DESIGNED	DEM	CHECKED	TAT
			DRAWN	TJW	06/2017	06/2017
			QUANTITIES	TAT	06/2017	06/2017
			ISSUE DATE		FEDERAL PROJECT NO.	SHEET NO.
SUBDIRECTORY			.DGN LOCATOR	SHEET SCALE		
XX			14_BoringLog 03	AS NOTED		
			REV. DATE		X-A001 (160)	14
						23

 Stantec

FED. ROAD DIV. NO.	STATE	PROJ.	FISCAL YEAR	SHET. NO.	TOTAL SHEETS
1	N. H.	523(9)	40	209	



STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN

TOWN BEDFORD BRIDGE NO. 151/151 STATE PROJECT 16156
LOCATION NH ROUTE 114 OVER BOWMAN BROOK

BORING LOGS (SHEET 4 OF 4)

BRIDGE SHEET
9 of 17

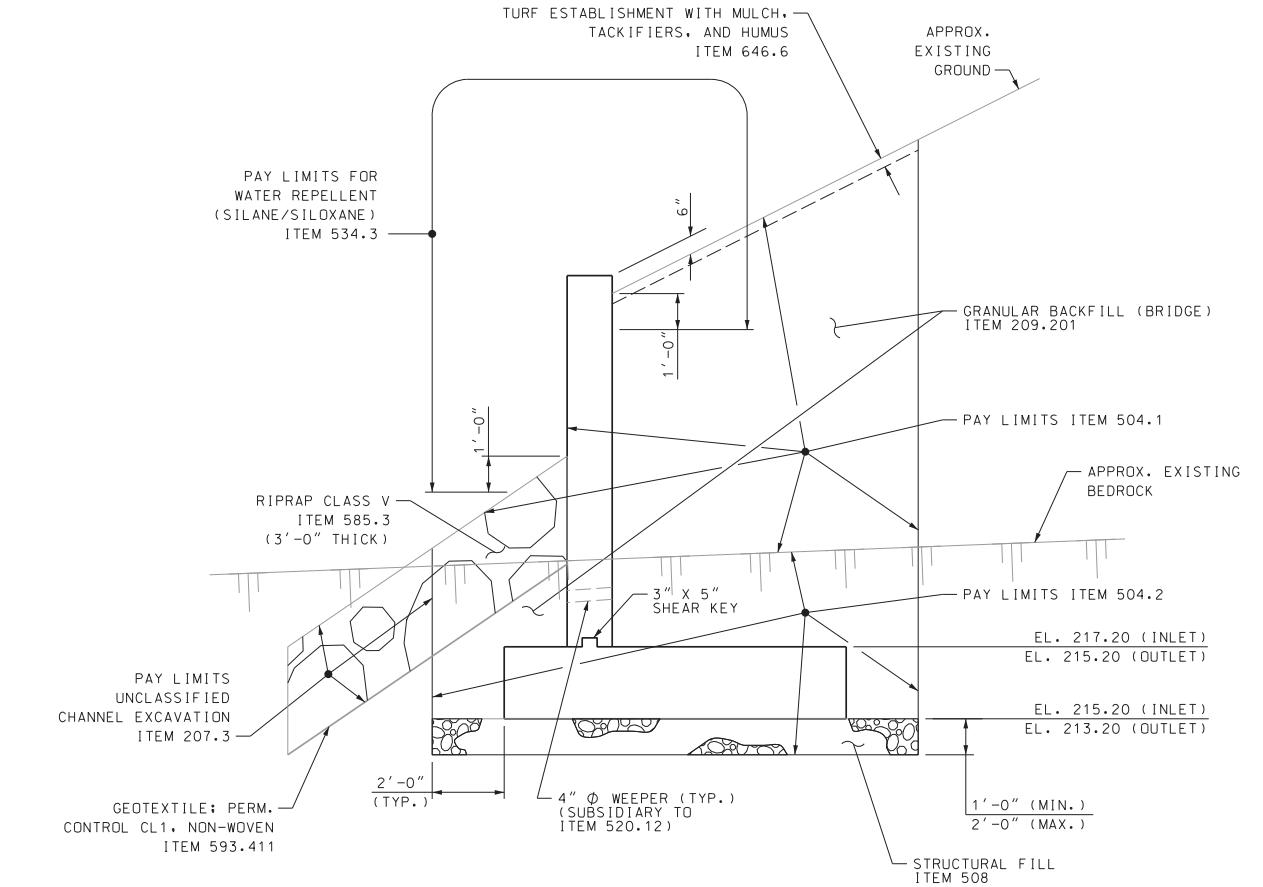
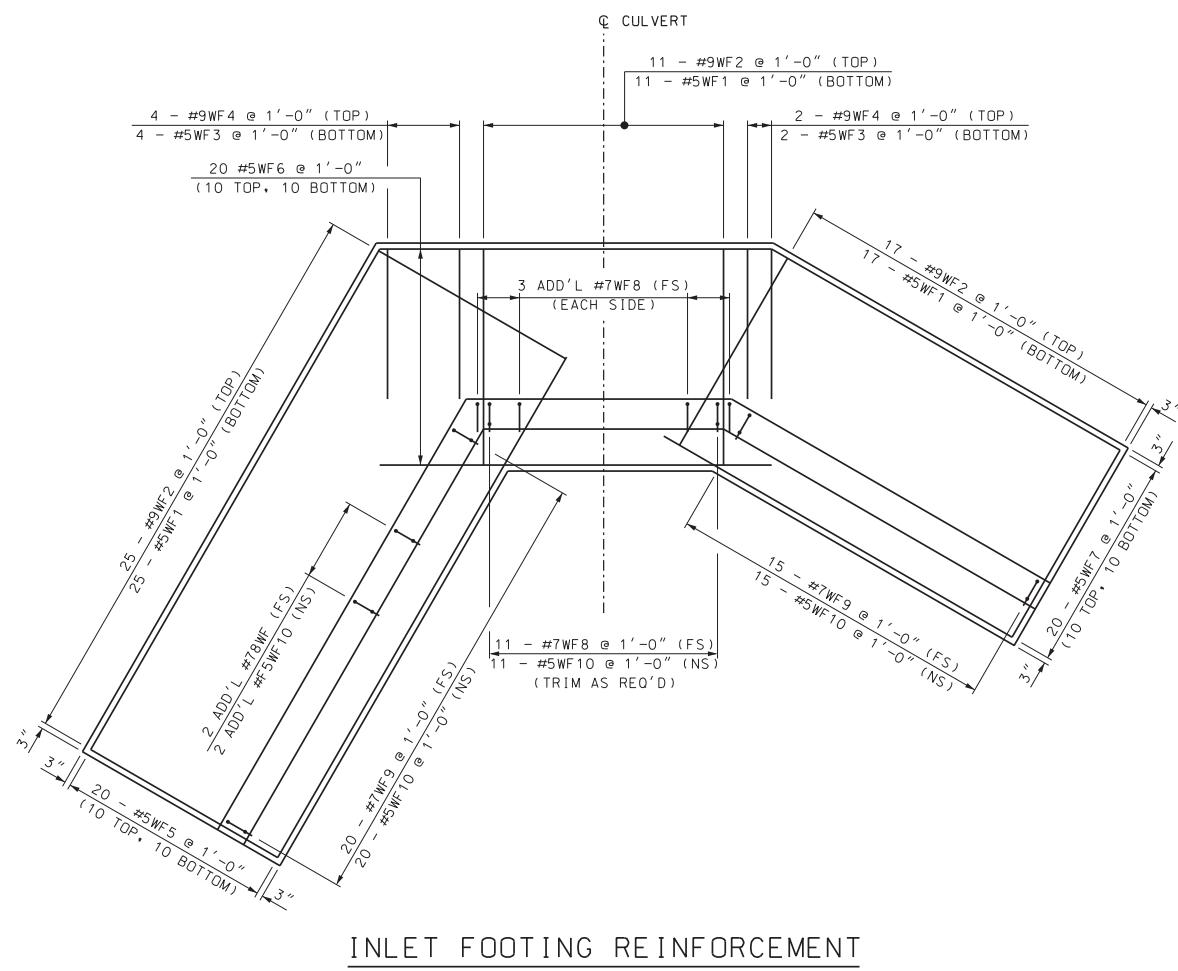
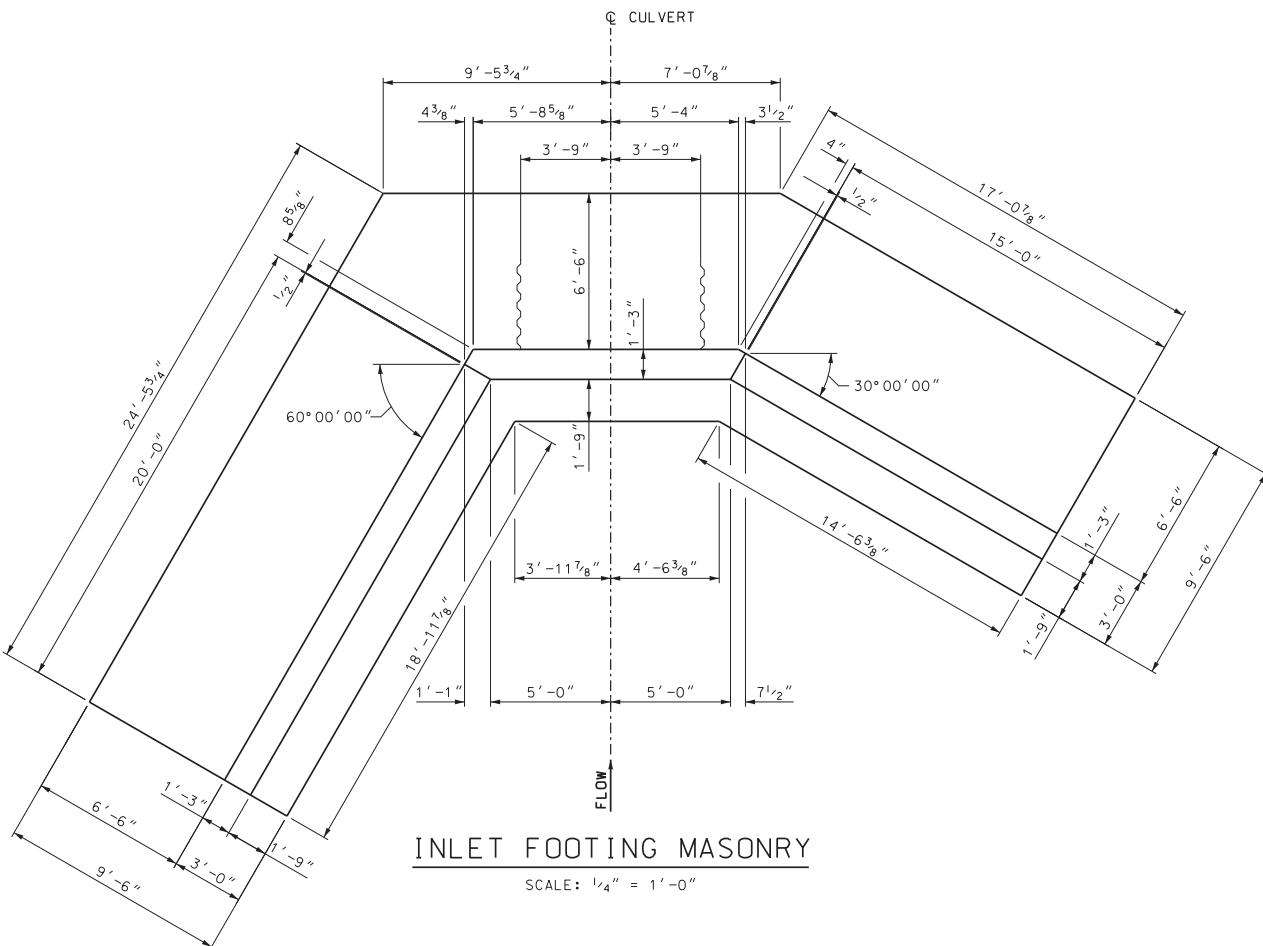
FILE NUMBER

128-3-2

REVISIONS AFTER PROPOSAL		BY DATE	BY DATE	BY DATE
		DESIGNED	DEM	06/2017
		DRAWN	TJW	06/2017
		QUANTITIES	TAT	06/2017
		ISSUE DATE		FEDERAL PROJECT NO.
		REV. DATE		SHEET NO.
		X-A-001 (160)		15
				TOTAL SHEETS 23

 Stantec

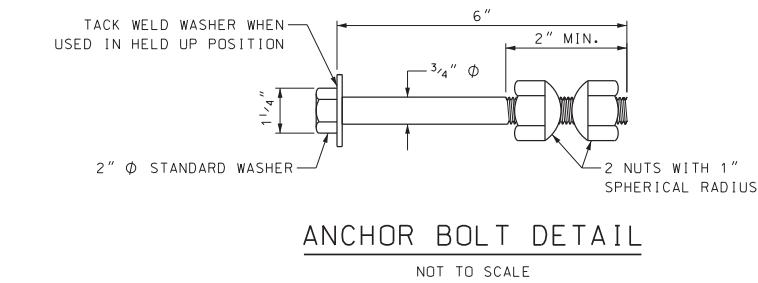
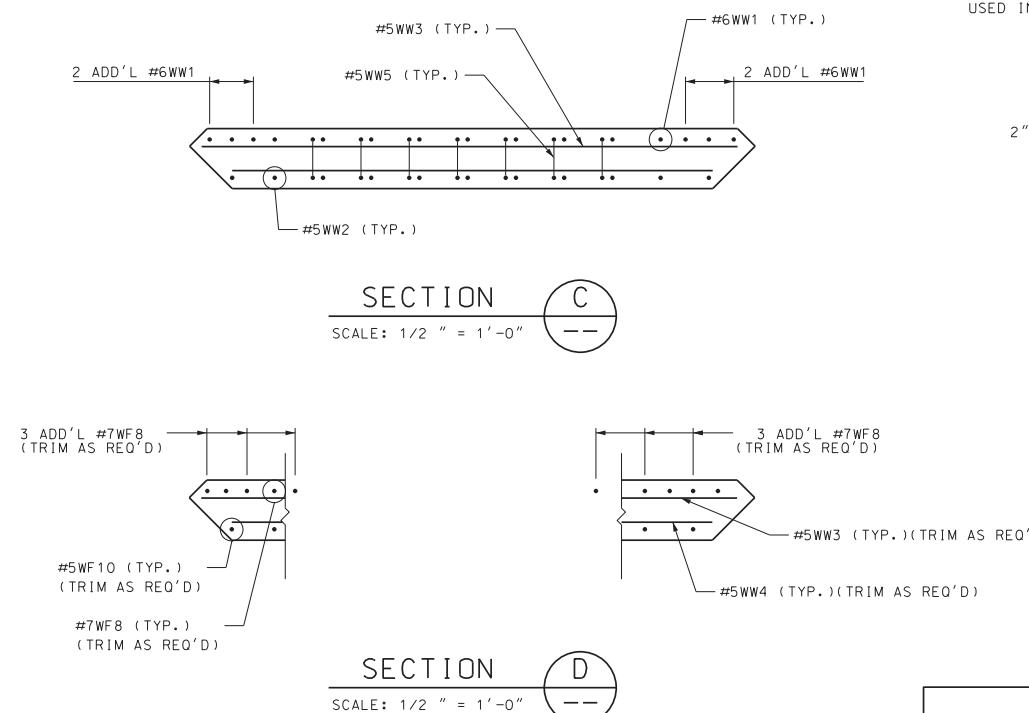
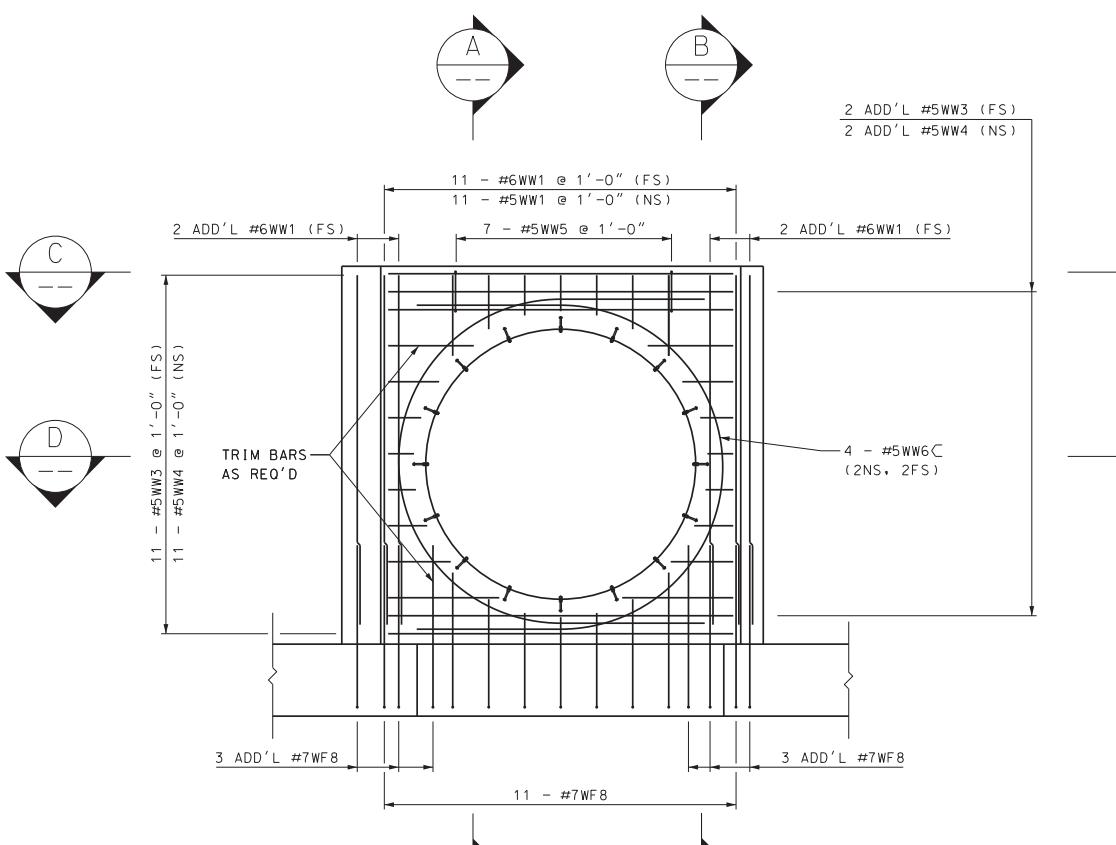
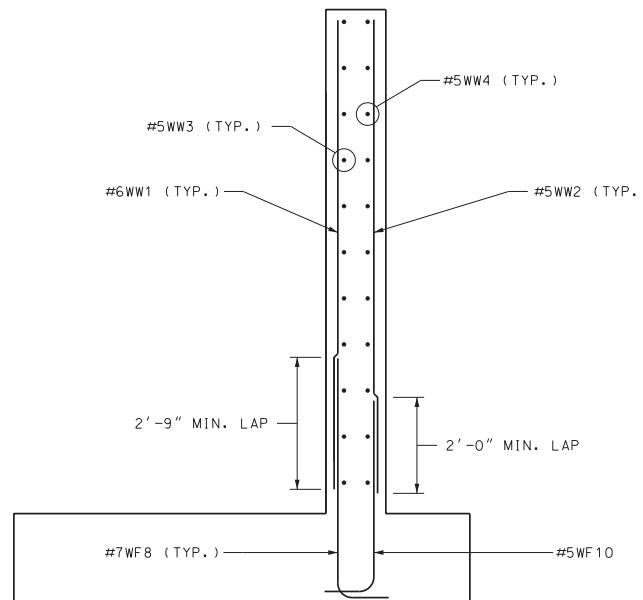
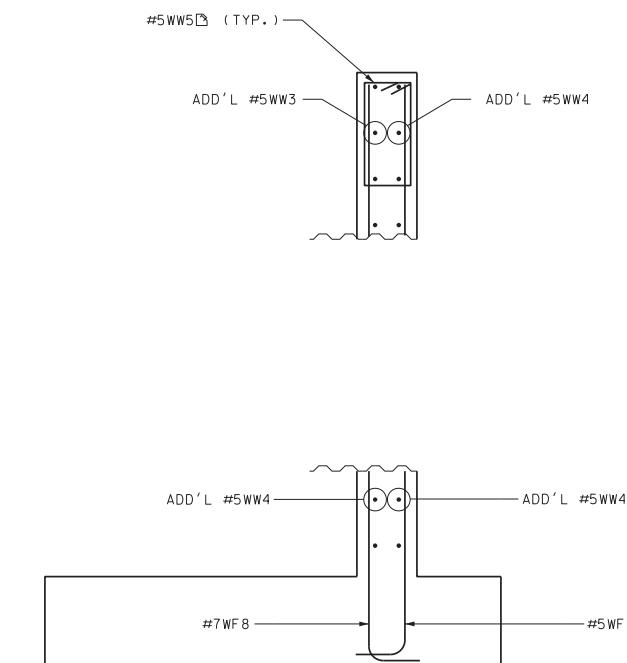
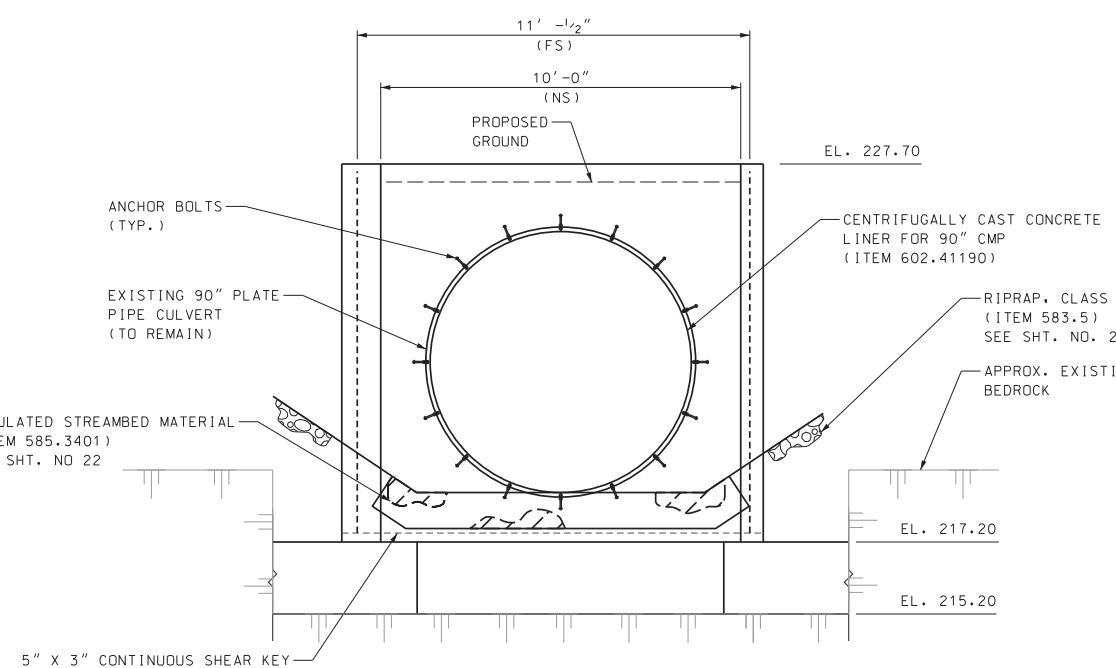
SUBDIRECTORY	.DGN LOCATOR	SHEET SCALE
XX	15_BoringLog 04	AS NOTED



TYPICAL SECTION

SCALE: $\frac{3}{8}'' = 1'-0''$

STATE OF NEW HAMPSHIRE							
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN							
TOWN	BEDFORD	BRIDGE NO.	151/151	STATE PROJECT	16156		
LOCATION	NH ROUTE 114 OVER BOWMAN BRROK						
INLET FOOTING DETAILS						BRIDGE SHEET	
REVISIONS AFTER PROPOSAL		BY	DATE	BY	DATE	10 OF 17	
		DESIGNED	JGS	08/2017	CHECKED	DEM	08/2017
		DRAWN	TJG	08/2017	CHECKED	TAT	08/2017
		QUANTITIES	JGS	08/2017	CHECKED	TAT	08/2017
LE		ISSUE DATE		FEDERAL PROJECT NO.		SHEET NO.	TOTAL SHEETS
D		REV. DATE		X-A001 (160)		16	23

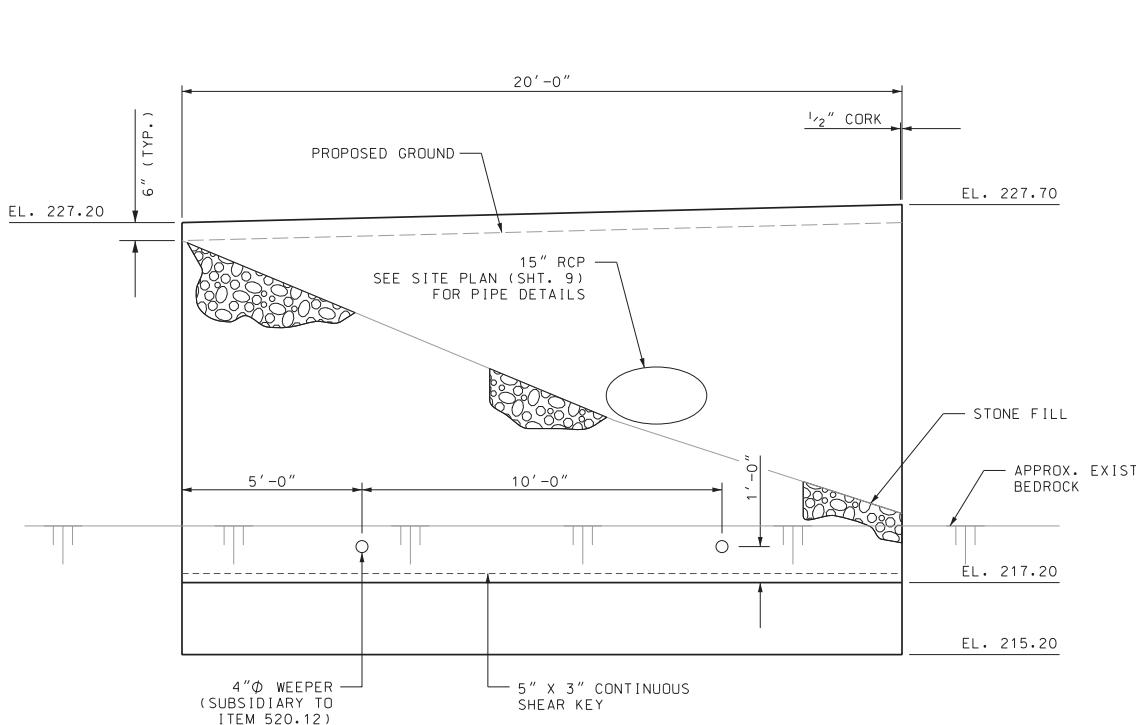


NOTE:

- ANCHOR BOLTS SHALL BE SUBSIDIARY TO ITEM 520.12.
- ALL ANCHOR BOLTS SHALL BE GALVANIZED STEEL MEETING THE REQUIREMENTS OF ASTM A-307 OR A-325 WITH ZINC COATING IN ACCORDANCE WITH ASTM 153 (INCLUDING THE NUTS AND WASHERS).
- ANCHOR BOLTS SHALL BE CAST INTO CONCRETE HEADWALLS, SPACED AS SHOWN (32 REQ'D, 16 EACH HEADWALL).
- TYPICAL TO BOTH INLET AND OUTLET HEADWALLS

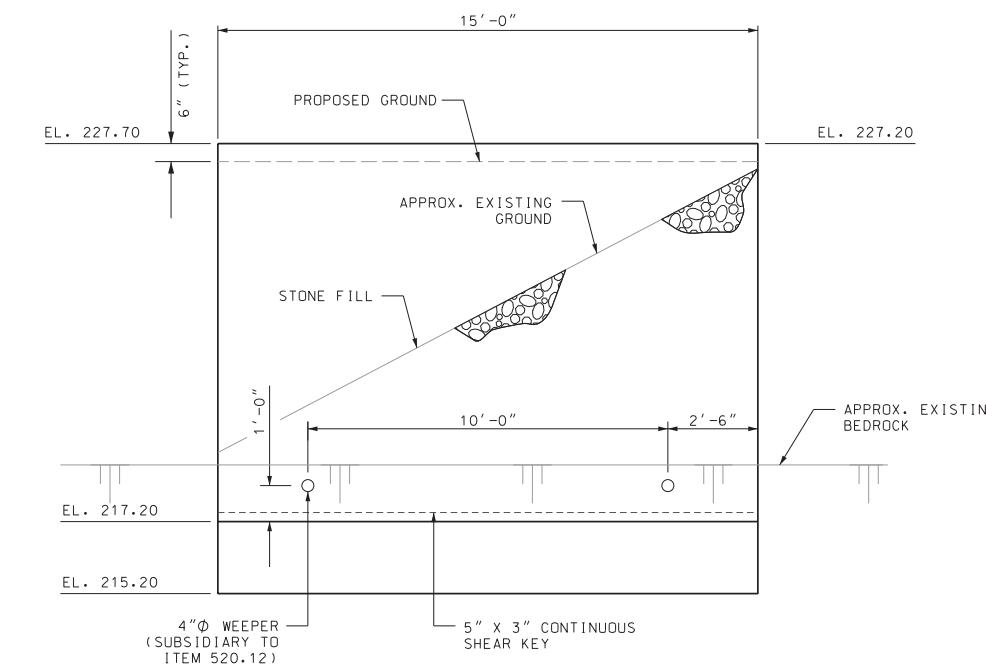
STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN

TOWN	BEDFORD	BRIDGE NO.	151/151	STATE PROJECT	16156	
LOCATION	NH ROUTE 114 OVER BOWMAN BROOK					
INLET HEADWALL DETAILS						
REVISIONS AFTER PROPOSAL		DESIGNED	BY	DATE	BY	DATE
		JGS	08/2017	CHECKED	DEM	08/2017
DRAWN		TJW	08/2017	CHECKED	TAT	08/2017
QUANTITIES		JGS	08/2017	CHECKED	TAT	08/2017
SUBDIRECTORY		.DGN LOCATOR	SHEET SCALE	FEDERAL PROJECT NO. SHEET NO. TOTAL SHEETS		
BRC/ABUT A		17_Inlet_Headwall_Details	AS NOTED	X-A001 (160) 17 23		
REV. DATE						



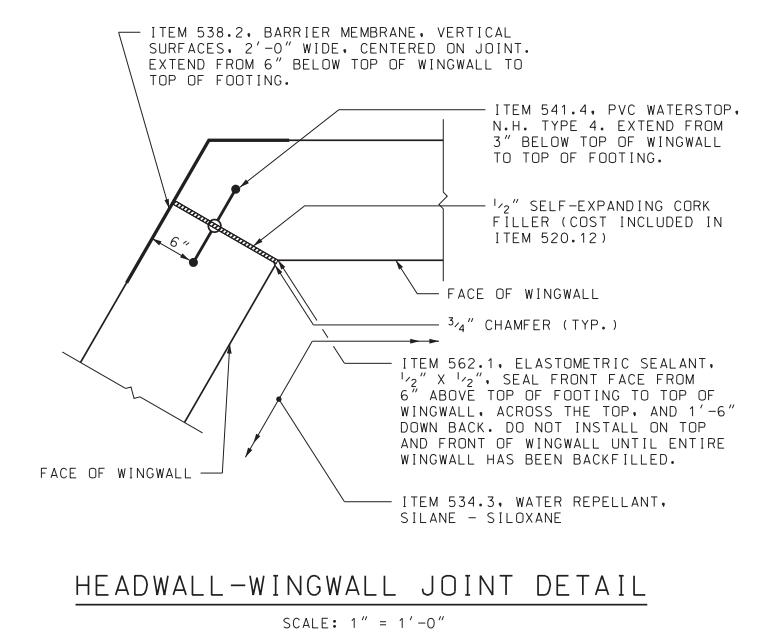
NORTHWEST WINGWALL MASONRY

SCALE: $\frac{3}{8}$ " = 1'-0"



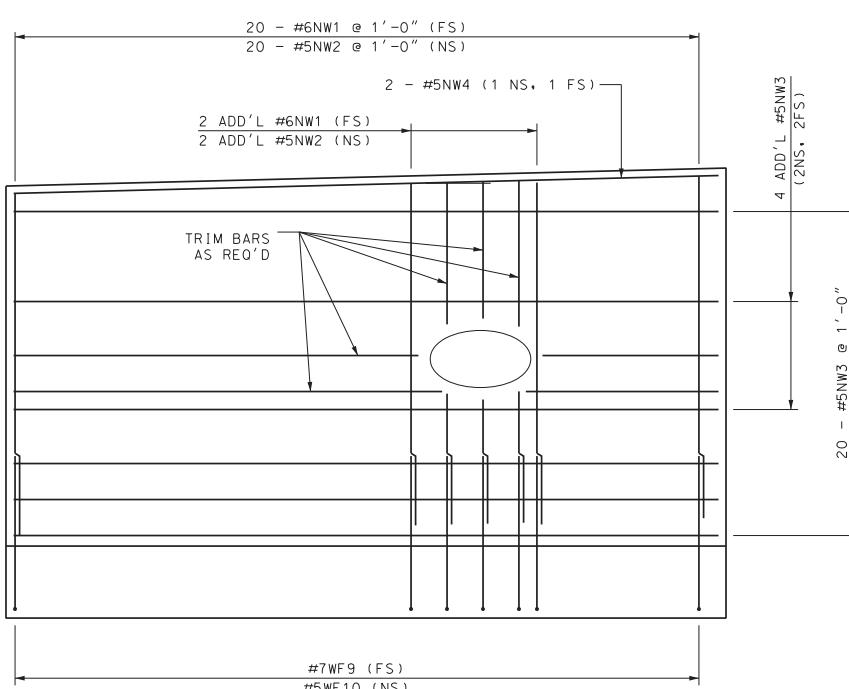
SOUTHWEST WINGWALL MASONRY

SCALE: $\frac{3}{8}$ " = 1'-0"



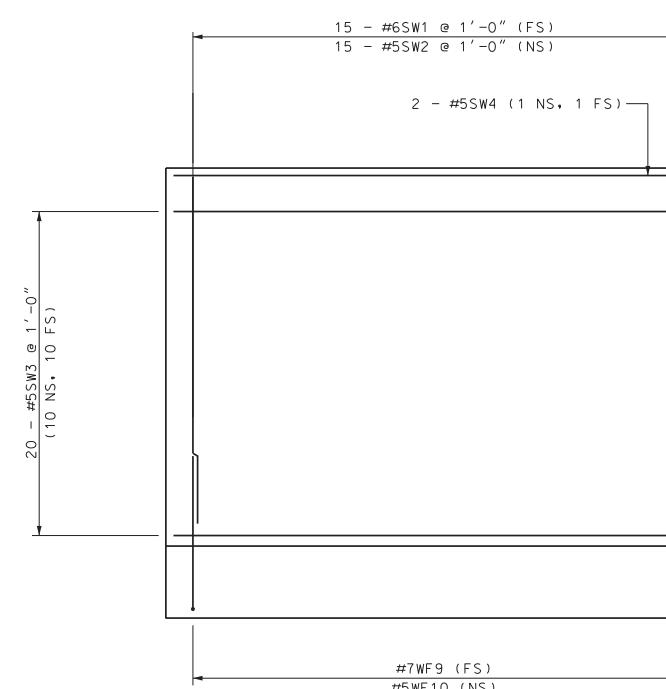
HEADWALL-WINGWALL JOINT DETAIL

SCALE: 1" = 1'-0"



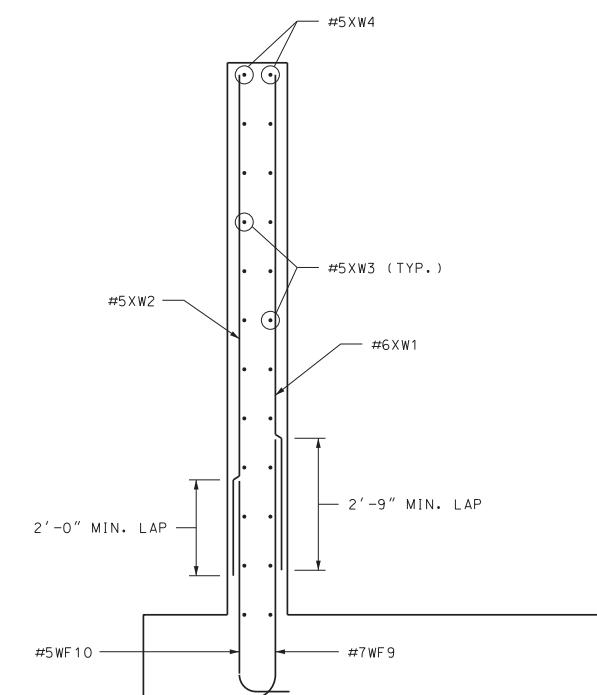
NORTHWEST WINGWALL REINFORCEMENT

SCALE: $\frac{3}{8}$ " = 1'-0"



SOUTHWEST WINGWALL REINFORCEMENT

SCALE: $\frac{3}{8}$ " = 1'-0"



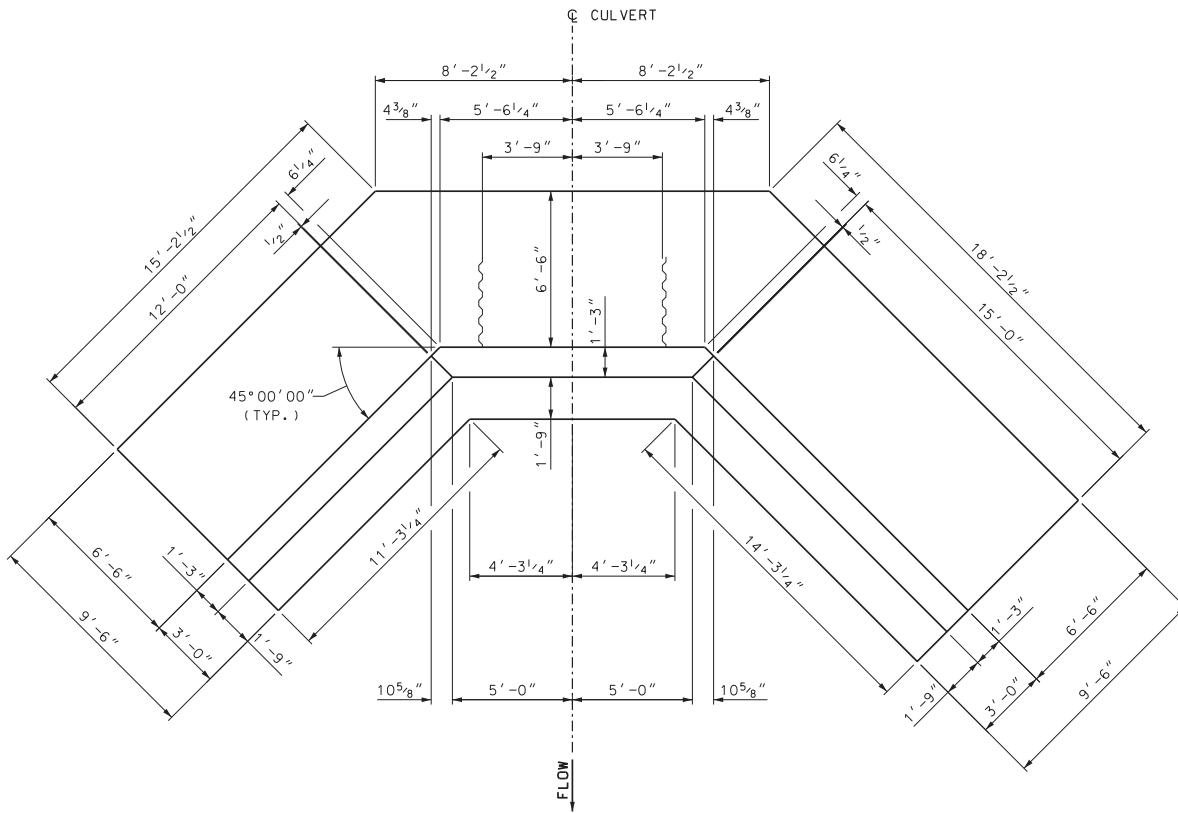
TYPICAL REINFORCEMENT SECTION

SCALE: 1/2" = 1'-0"

STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN																		
TOWN		BEDFORD		BRIDGE NO.		151/151		STATE PROJECT		16156								
LOCATION										NH ROUTE 114 OVER BOWMAN BROOK								
INLET WINGWALL DETAILS																		
REVISIONS AFTER PROPOSAL		DESIGNED	JGS	08/2017	CHECKED	DEM	08/2017			BRIDGE SHEET								
		DRAWN	TJG	08/2017	CHECKED	TAT	08/2017			FILE NUMBER								
QUANTITIES		JGS	08/2017	CHECKED	TAT	08/2017				128-3-2								
ISSUE DATE		FEDERAL PROJECT NO.		SHEET NO.						TOTAL SHEETS								
REV. DATE		X-A001 (160)		18						23								
SUBDIRECTORY	.DGN LOCATOR	SHEET SCALE																
BRC\ABUT A18	INLET WINGWALL DETAILS AS NOTED																	

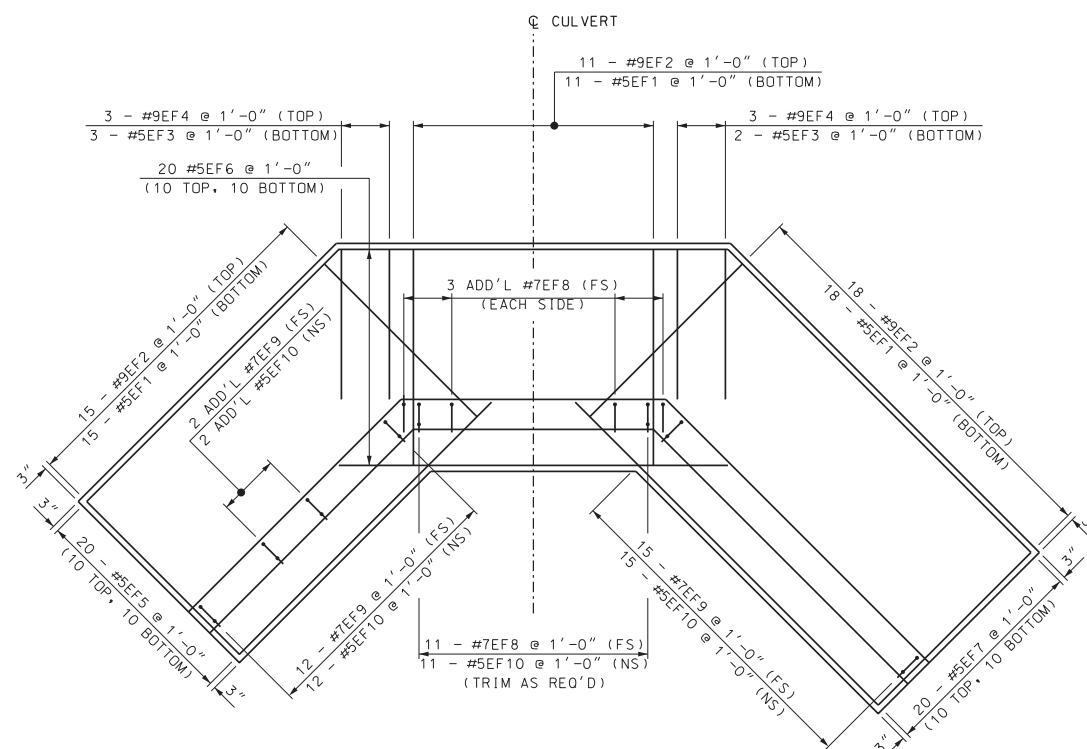
 **Stantec**

SUBDIRECTORY .DGN LOCATOR SHEET SCALE
BRC\ABUT A18 INLET WINGWALL DETAILS AS NOTED



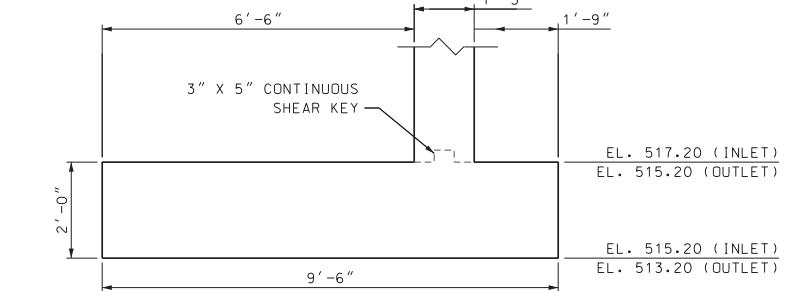
OUTLET FOOTING MASONRY

SCALE: $1/4'' = 1'-0''$



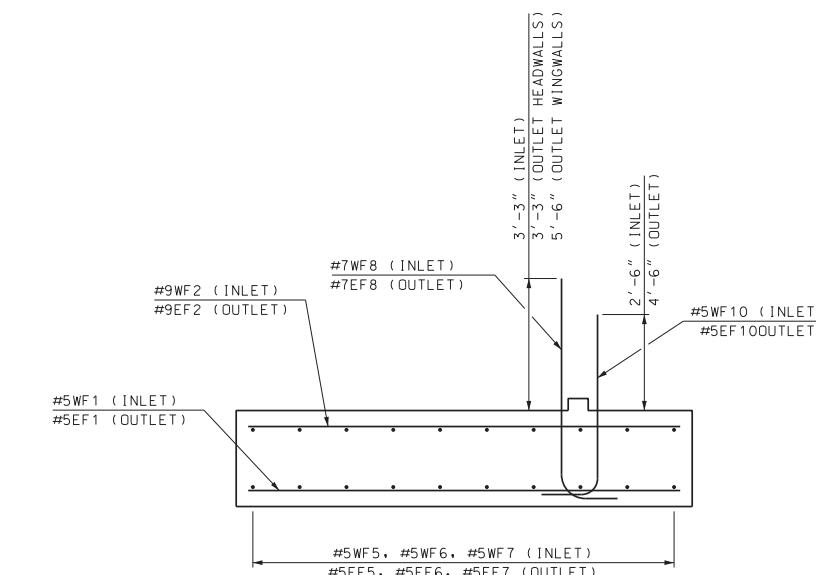
OUTLET FOOTING REINFORCEMENT

SCALE: $1/4'' = 1'-0''$



TYPICAL FOOTING SECTION

SCALE: $1/2'' = 1'-0''$



TYPICAL FOOTING REINFORCEMENT

SCALE: $1/2'' = 1'-0''$

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN

TOWN BEDFORD BRIDGE NO. 151/151 STATE PROJECT 16156

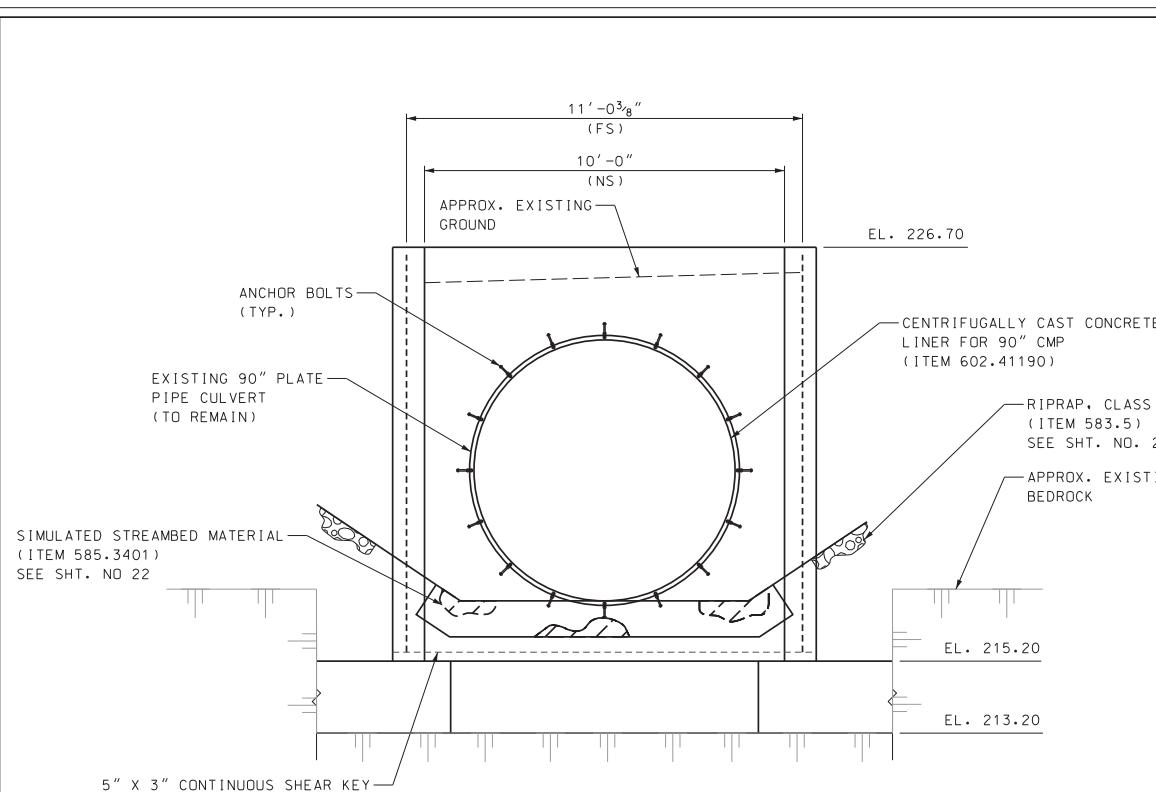
LOCATION NH ROUTE 114 OVER BOWMAN BROOK

OUTLET FOOTING DETAILS

BRIDGE SHEET
13 OF 17

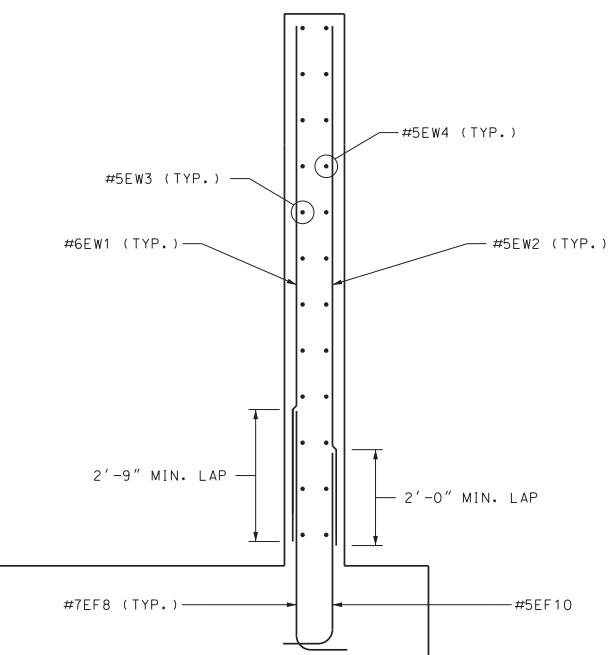
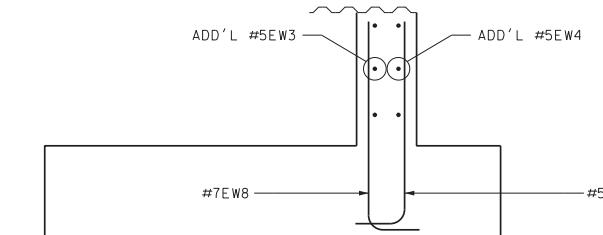
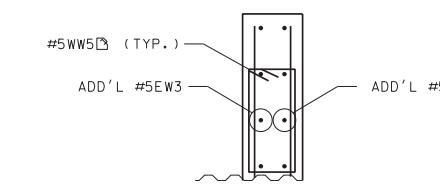
FILE NUMBER
128-3-2

REVISIONS AFTER PROPOSAL	BY	DATE	BY	DATE
DRAWN	JGS	08/2017	CHECKED	DEM
QUANTITIES	JGS	08/2017	CHECKED	TAT
ISSUE DATE			FEDERAL PROJECT NO.	
REV. DATE			SHEET NO.	
				TOTAL SHEETS
				23



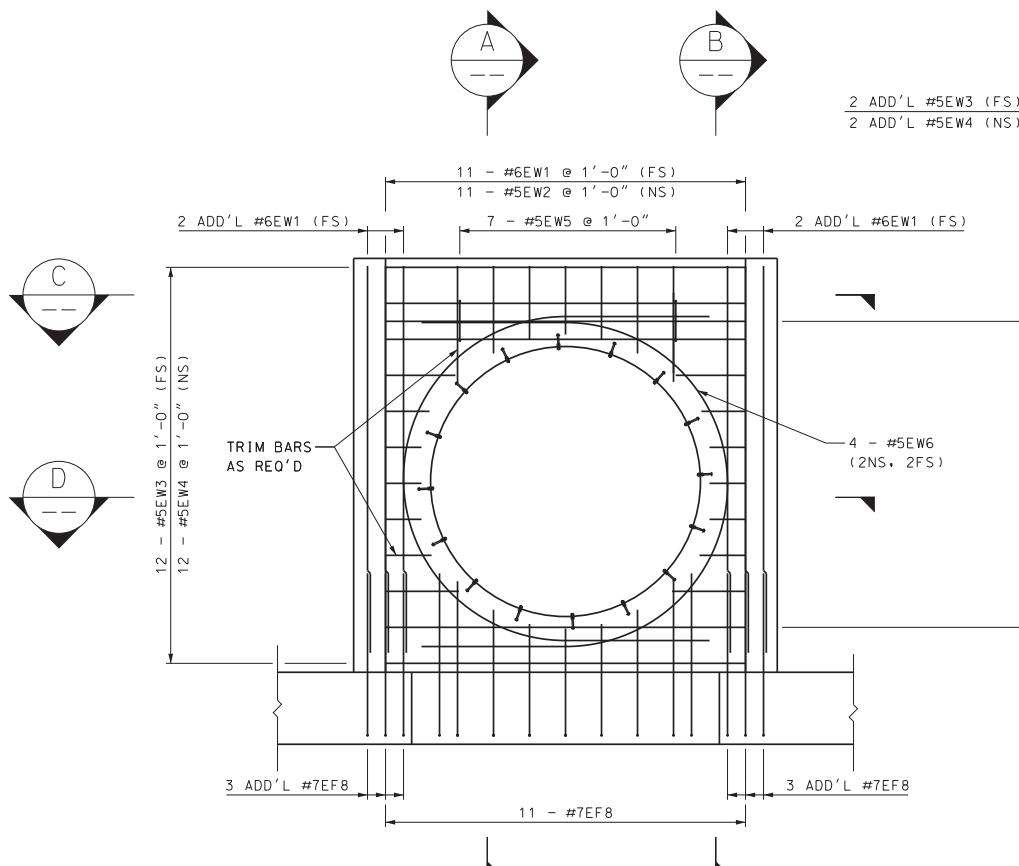
OUTLET HEADWALL MASONRY

SCALE: 3/8 " = 1'-0"



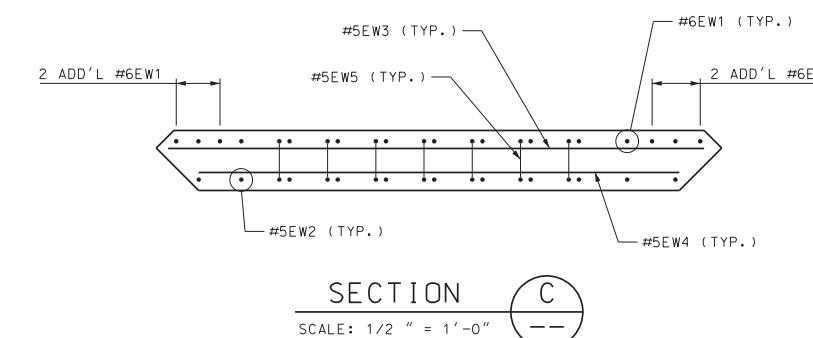
A SECTION
SCALE: 1/2 " = 1'-0"

B SECTION
SCALE: 1/2 " = 1'-0"

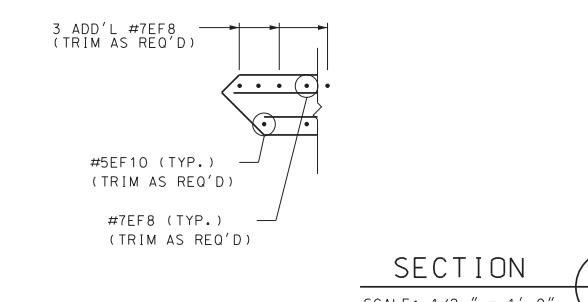


OUTLET HEADWALL REINFORCEMENT

SCALE: 3/8 " = 1'-0"



C SECTION
SCALE: 1/2 " = 1'-0"

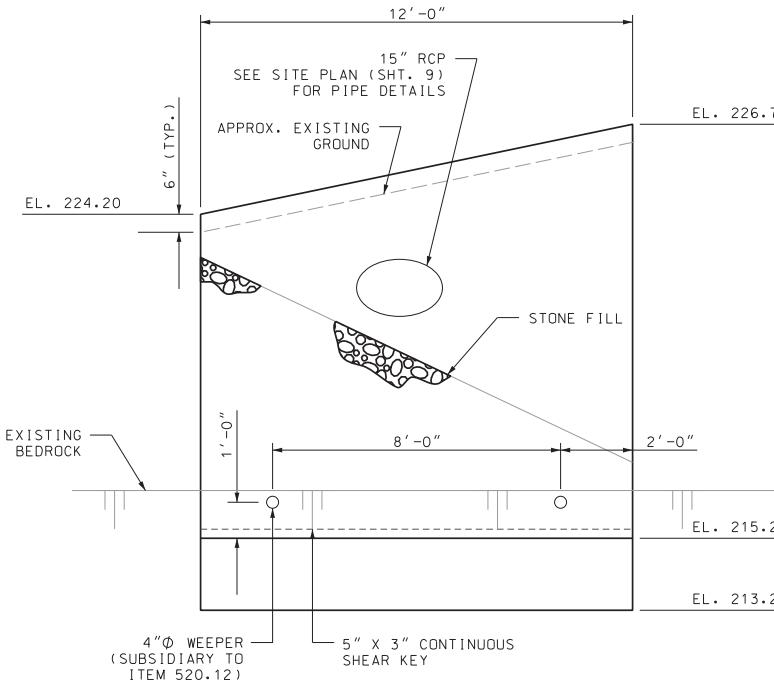


D SECTION
SCALE: 1/2 " = 1'-0"

STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN																			
TOWN		BEDFORD		BRIDGE NO.		151/151		STATE PROJECT		16156									
LOCATION NH ROUTE 114 OVER BOWMAN BROOK																			
OUTLET HEADWALL DETAILS										BRIDGE SHEET									
										14 OF 17									
										FILE NUMBER									
										128-3-2									
REVISIONS AFTER PROPOSAL																			
				DESIGNED		BY		DATE		BY									
		JGS		08/2017		CHECKED		DEM		08/2017									
		DRAWN		TJW		08/2017		CHECKED		TAT									
		QUANTITIES		JGS		08/2017		CHECKED		TAT									
SUBDIRECTORY		.DGN LOCATOR		SHEET SCALE															
BRC\ABUT A		20_Outlet_Headwall_Details		AS NOTED															
		ISSUE DATE		FEDERAL PROJECT NO.		SHEET NO.													
		REV. DATE		X-A001 (160)		20													
		TOTAL SHEETS																	
		23																	

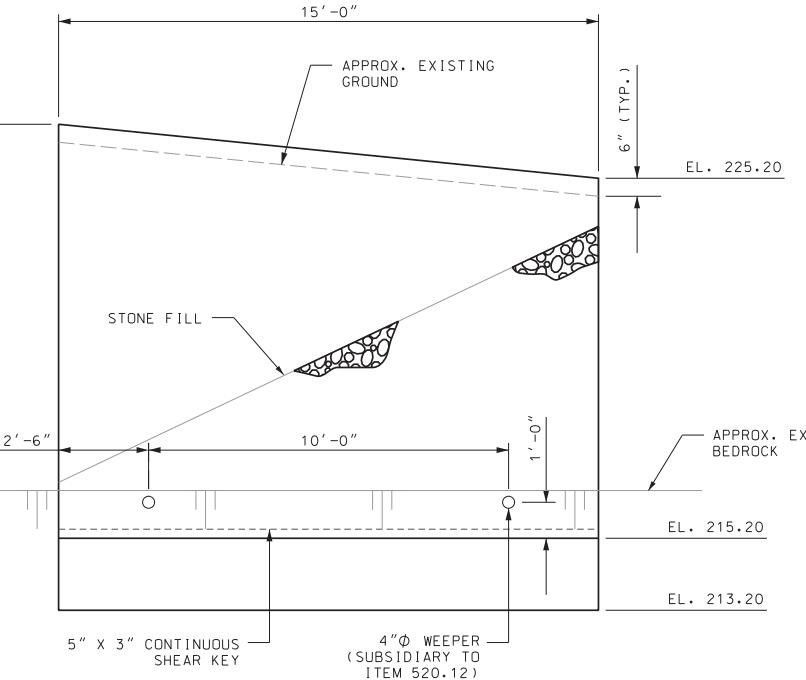
 Stantec

SUBDIRECTORY .DGN LOCATOR SHEET SCALE
BRC\ABUT A 20_Outlet_Headwall_Details AS NOTED



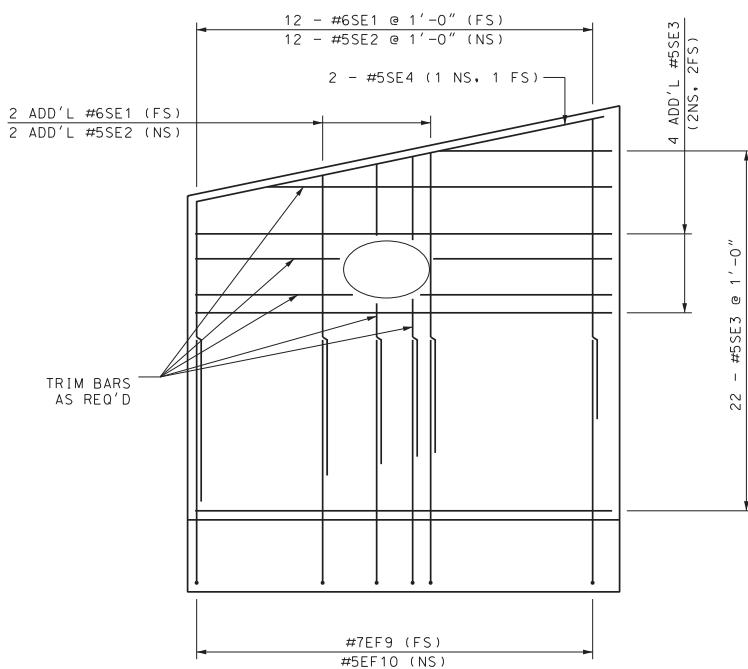
SOUTHEAST WINGWALL MASONRY

SCALE: $\frac{3}{8}$ " = 1'-0"



NORTHEAST WINGWALL MASONRY

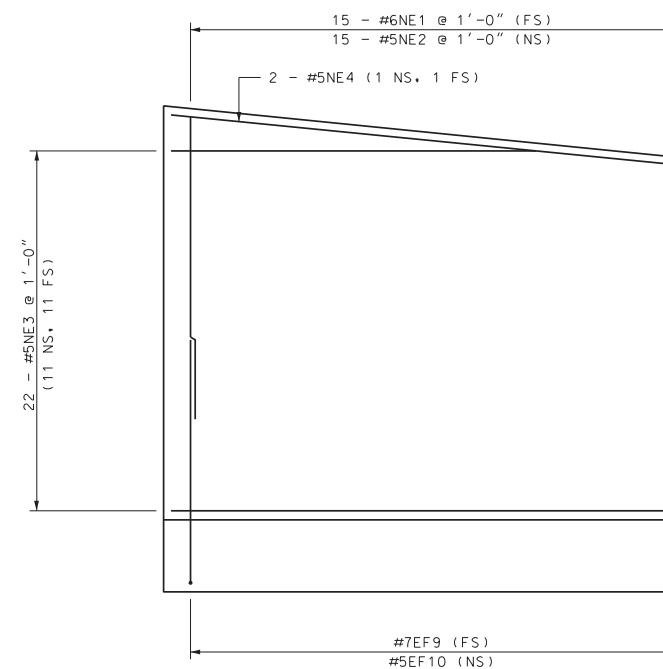
SCALE: $\frac{3}{8}$ " = 1'-0"



SOUTHEAST WINGWALL

REINFORCEMENT

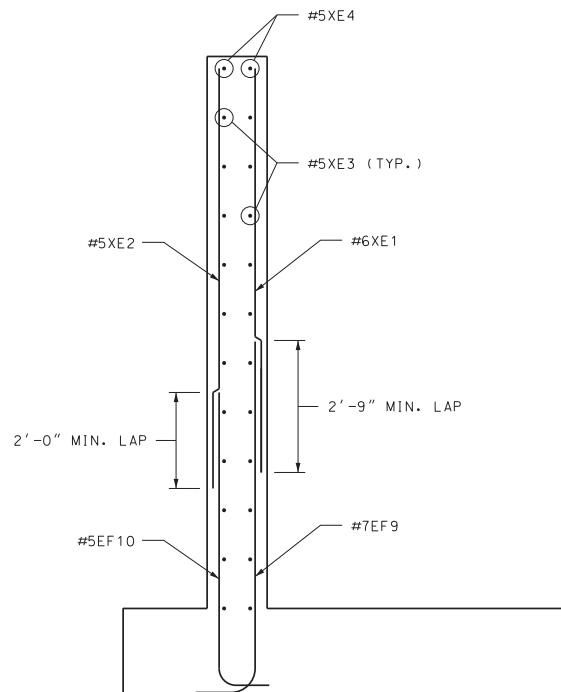
SCALE: $\frac{3}{8}$ " = 1'-0"



NORTHEAST WINGWALL

REINFORCEMENT

SCALE: $\frac{3}{8}$ " = 1'-0"



TYPICAL REINFORCEMENT SECTION

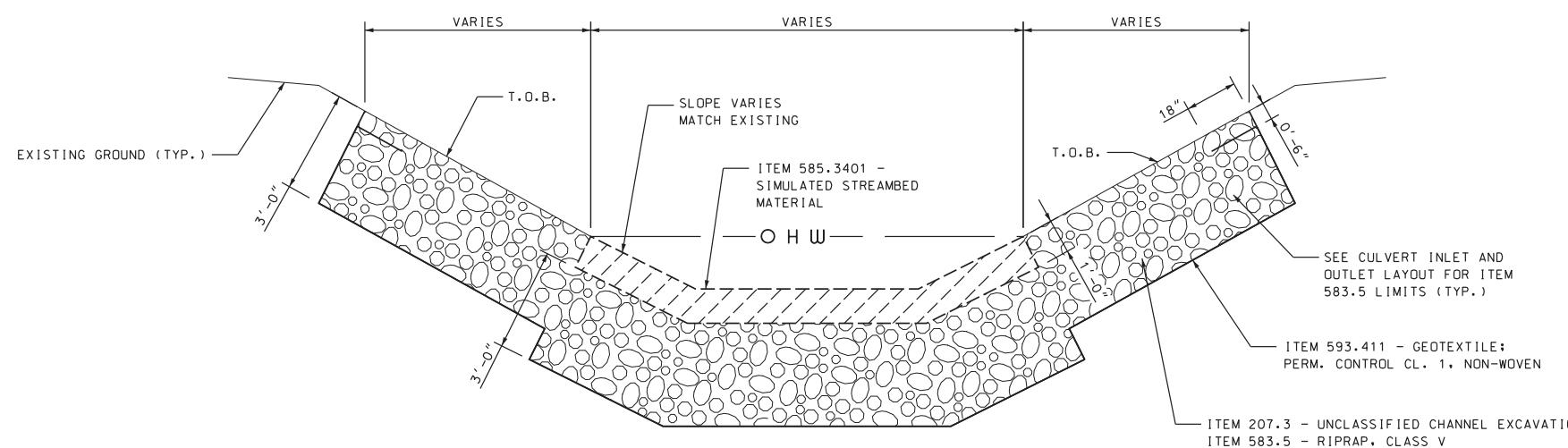
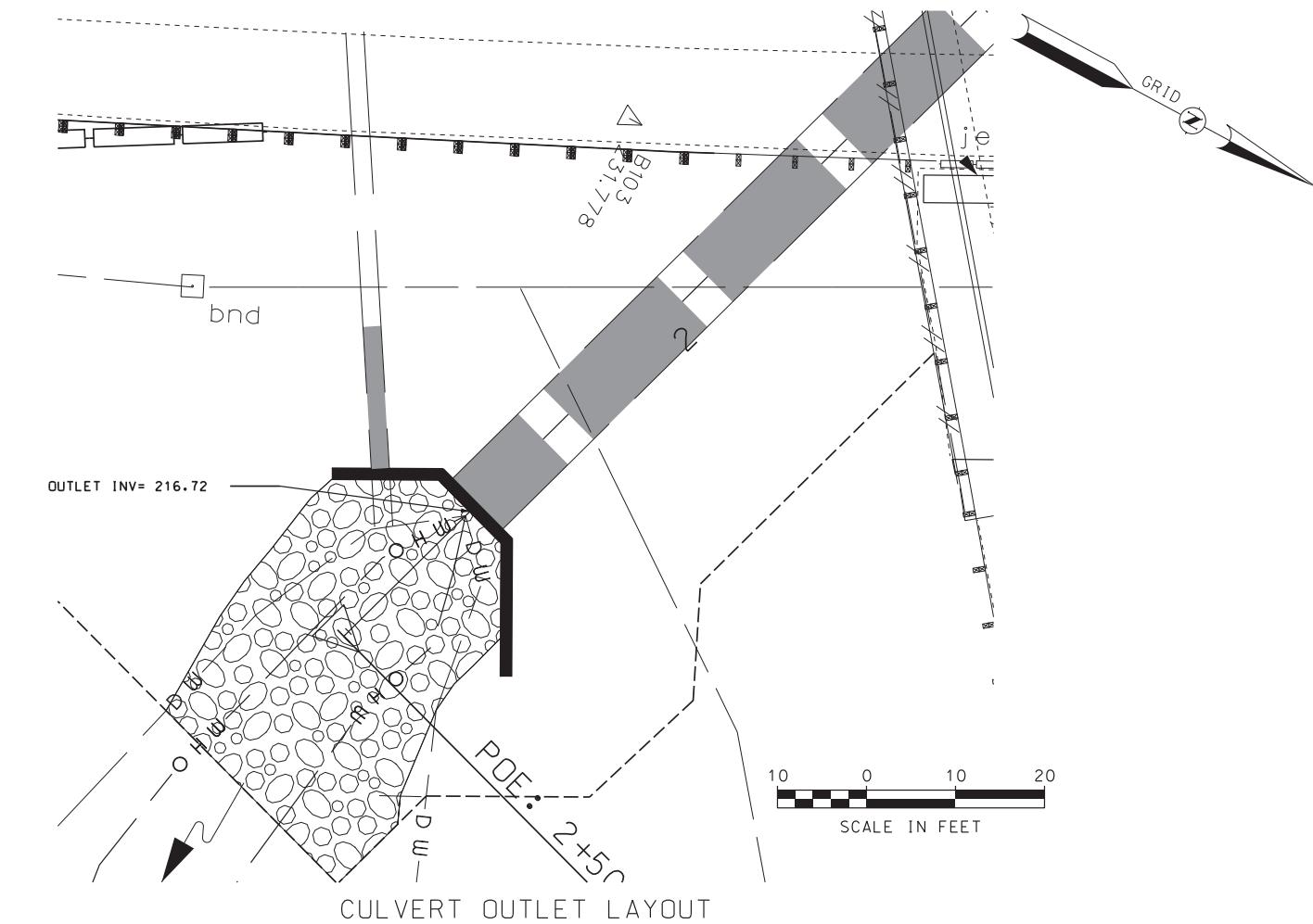
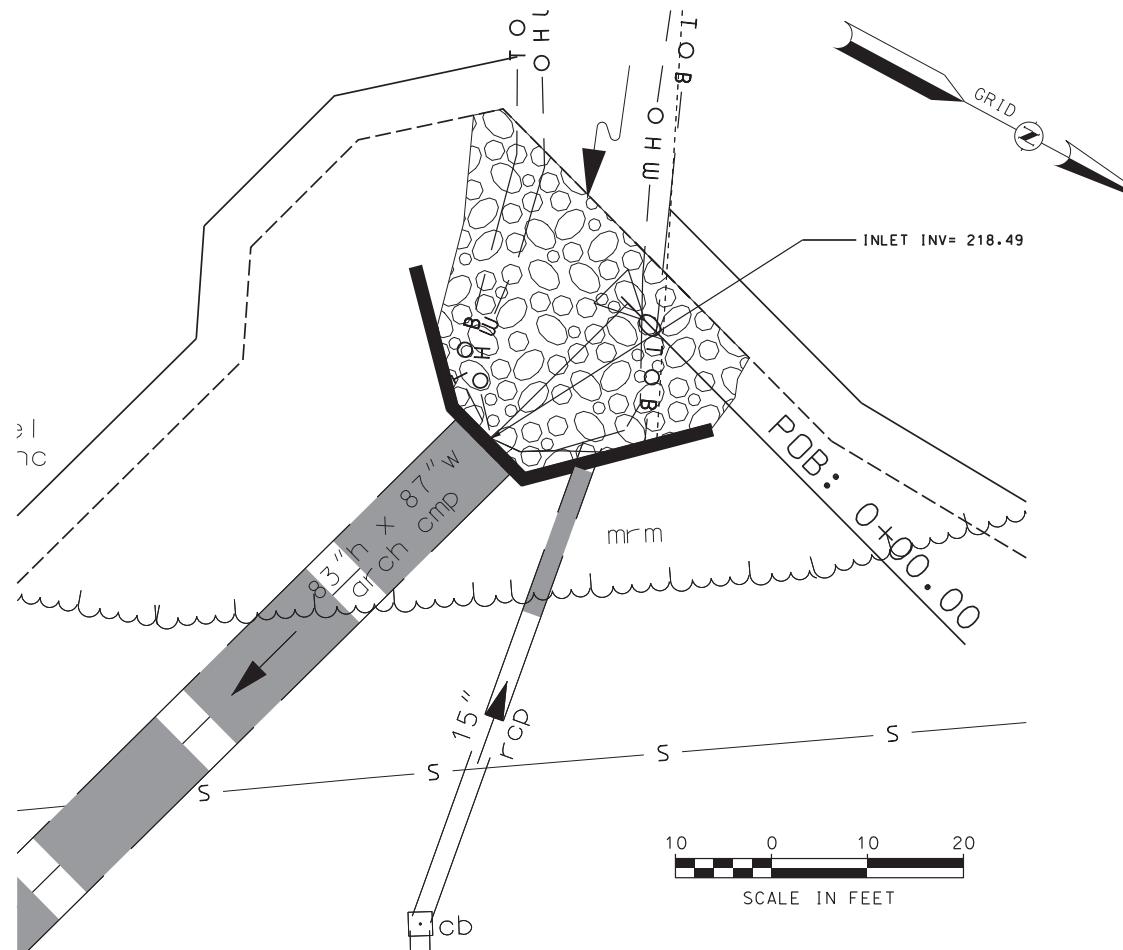
SCALE: $\frac{1}{2}$ " = 1'-0"

STATE OF NEW HAMPSHIRE											
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN											
TOWN		BEDFORD		BRIDGE NO.		151/151		STATE PROJECT		16156	
LOCATION	NH ROUTE 114 OVER BOWMAN BROOK	REVISIONS AFTER PROPOSAL		DESIGNED	JGS	08/2017	CHECKED	BY	DATE	15 OF 17	FILE NUMBER
OUTLET WINGWALL DETAILS											
DRAWN	TJG	08/2017	CHECKED	TAT	08/2017						
QUANTITIES	JGS	08/2017	CHECKED	TAT	08/2017						
ISSUE DATE											
FEDERAL PROJECT NO.											
REV. DATE											
SHEET NO.											
TOTAL SHEETS											

 **Stantec**

SUBDIRECTORY .DGN LOCATOR SHEET SCALE
BRC\ABUT\&1_OUTLET WINGWALL DETAILS AS NOTED

ISSUE DATE FEDERAL PROJECT NO. SHEET NO.
REV. DATE X-A001 (160) 21 23



CULVERT INLET & OUTLET
TYPICAL SECTION w/ SIMULATED STREAMBED MATERIAL
(NOT TO SCALE)



STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN

TOWN		BRIDGE NO.		STATE PROJECT	
LOCATION		151/151		16156	
CULVERT INLET AND OUTLET DETAILS					
REVISIONS AFTER PROPOSAL		BY	DATE	BY	DATE
		DESIGNED	DEM	06/2017	CHECKED
		DRAWN	TJW	06/2017	TAT
		QUANTITIES	TAT	06/2017	06/2017
		ISSUE DATE		FEDERAL PROJECT NO.	SHEET NO.
		REV. DATE		X-A001 (160)	22
					TOTAL SHEETS 23

